UNITED STATES DEPARTMENT OF THE INTERIOR
J. A. KRUG, Secretary

BUREAU OF MINES
R. R. SAYERS, Director

Technical Paper 682

ANALYSES OF ALASKA COALS

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1946

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 25 cents

PREFACE

One of the important functions of the Bureau of Mines is the analysis of coal from every coal-mining State and from Alaska. These analyses are being published for use of Government officials and the public.

In connection with analytical data showing composition and quality of coals of the States, consumers, producers, and the general public will be interested also in a brief description of the geologic structure of the coal basins, typical mining conditions in the several districts, and important economic data on the industry. These publications therefore are designed to include such features to present in concise form the principal facts regarding occurrence, reserves, quality, characteristics, production, and uses of coals of each producing State.

Alaska is known to have extensive coal reserves ranging in rank from lignite to anthracite. Coal beds occur along the coast as well as in the interior of Alaska, but additional prospecting work must be done before the tonnage of recoverable coal can be estimated. In 1909 the Geological Survey estimated the minimum reserves of the known coal fields in Alaska at 15,104,500,000 short tons. In 1913 the Survey published a revised estimate of more than 21,597,000,000 short tons. It was recognized, however, that many times this tonnage eventually will be found available as the Territory is more thoroughly explored and more detailed information is obtained.

Reconnaissance work in areas that had not been surveyed in 1913 and detailed investigations in areas that were little known in 1913 have greatly increased the estimates of known reserves, which in this report total nearly 100 billion short tons. Most of the available information has been obtained from reconnaissance surveys and indicates only the order of magnitude of the reserves. It is believed that even these latest revised estimates are conservative and that future surveys will disclose further coal reserves of the Territory.

Production of coal in Alaska during 1943 aggregated 289,232 short tons, valued at the mines at $1,842,000, or an average per ton of $6.37. This output came from 5 active mines of commercial size, which worked an average of 321 days, employed 251 men, and produced an average of 3.59 tons per man per day. The economic position of the coal industry of Alaska and the trend of development in recent years are discussed in the section on Production, Distribution, and Use.

The samples, represented by the analyses reported herein, have been taken by representatives of the Geological Survey, Bureau of Mines, War and Navy Departments, and Alaskan Engineering Commission. The analyses of delivered-coal samples bearing index numbers 1 to 129, inclusive, and the mine samples designated by laboratory numbers preceded by "X" were made by M. L. Sharp at Anchorage, Alaska. All other analyses were made in the laboratory of the Bureau of Mines at Pittsburgh, Pa.

From time to time the Bureau has published analytical results in large bulletins. Although the analyses in any one bulletin are grouped by States or by special uses, to find the analyses of coals from any particular section of the country necessitates reading a number of bulletins, some of which are no longer available for distribution.

Moreover, when the Bureau receives an inquiry for analyses of coal from any particular part of the country, it constitutes a large wastage of public documents to send a number of bulletins to show the analyses for an individual mine or for any one district. It therefore has been deemed expedient to republish the analyses of coal in a series of inexpensive publications by separate States or, if the coal production is small in any State, by groups of adjacent States. To these have been added analyses not previously published.

Technical Paper 269 on Iowa coal was the first of these to be issued. The technical papers published to date, with their numbers, are as follows: Alabama, 347; Arkansas, 416; Colorado, 574; Illinois, 641; Indiana, 417; Iowa, 269; Kansas, 455; Kentucky, 308 and 652; Maryland, 465; Missouri, 366; Montana, 529; New Mexico, 569; Ohio, 344; Oklahoma, 411; Pennsylvania bituminous, 590 (Supplement 645); Pennsylvania anthracite, 659; Tennessee, 356 and 671; Utah, 345; Virginia, 365 and 656; Washington 491 (Supplement 618); West Virginia, 405 and 626; and Wyoming 484. From time to time these papers will be revised to include later analyses and other data.

A. C. FIELDNER,
Chief, Fuels and Explosives Branch.

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COAL FIELDS OF ALASKA

By GEORGE O. GATES [2]

INTRODUCTION

Coal is distributed widely throughout Alaska in fields differing greatly in size and in geologic environment. Much of the known coal is in moderately or slightly deformed rocks and is of lignitic or subbituminous rank. However, bituminous coal and anthracite occur in some more intensely deformed rocks. Only those fields close to main lines of transportation have been developed or are likely to be of economic importance in the near future. Large deposits of coal occur in more-remote parts of the Territory, and when these are studied in greater detail or opened up the extent of the coal beds and reserves probably will be much larger than now estimated.

The major coal fields of Alaska are shown in figure 1 (folder). Almost all the coal produced from them in recent years has come from fields close to the Alaska Railroad, which extends from Seward on the Pacific coast to Fairbanks in the interior. The most important of these fields, both in terms of production and known reserves, are the lower Matanuska Valley field, 45 miles northeast of Anchorage, and the Nenana field, approximately 75 miles southwest of Fairbanks.

The central areas of the principal mountain ranges, as well as the eastern part of the Yukon Basin in Alaska and the Seward Peninsula, are chiefly regions of igneous and metamorphic rocks and contain little coal. The foothills and lowlands north of the Brooks Range and the western part of the Yukon Basin, largely underlain by Cretaceous rocks, are known to contain significant coal deposits. Within and along the borders of the extensive Pacific Mountain system are a number of basins and isolated areas of Tertiary rocks, many of which contain coal. The rocks within the mountain ranges are highly deformed, and the coal is of bituminous or anthracitic rank. Other areas on the flanks of the ranges or in the intermontane basins are less deformed, and the coal is of lignitic or subbituminous rank.

The coal fields are described here under regional headings. Many of the smaller, less-important coal areas are not mentioned, but references to reports describing them are given in the bibliography at the end of this section.

[1] Work on manuscript completed May 1945.
[2] Geologist, U. S. Department of the Interior, Geological Survey, Alaskan Branch.

COAL DEPOSITS

NORTHERN ALASKA AND SEWARD PENINSULA REGIONS

Coal of subbituminous and bituminous rank is known at many places north of the Brooks Range between the Colville River and the Arctic coast. Coal probably occurs at or near the surface throughout most of this tract which is at least 300 miles long in an east-west direction and in places as much as 120 miles wide. The coal is in the middle part of a sequence of upper Cretaceous rocks in a shale section as much as 5,000 feet thick underlain and overlain by marine sandstone and related rocks. The best-known sections are near the Arctic coast at Corwin and in the valleys of some of the larger streams that flow north. Near Corwin 34 coal beds aggregate 135 feet of coal; 15 of these beds, 3 to 30 feet thick, aggregate 115 feet of coal. In the Kukpowruk-Utukuk area, between Corwin and Wainwright, are 69 coal beds each at least 3 feet thick; the largest is 20 feet thick. In the northern part of the area the coal beds are flat lying or very gently warped. Farther south they are more closely folded, and dips as high as 90° have been reported. A small quantity of coal has been mined from the beds at Corwin and Wainwright.

Lenticular beds of bituminous coal and anthracite occur near Cape Lisburne in highly folded rocks of possible Carboniferous age, but so far as is known they are of small extent.

South of the Brooks Range in the Kobuk River Valley and on Seward Peninsula, small areas of poorly consolidated Tertiary sandstone and shale contain a few beds of lignite, some of which are as much as 5 feet thick. The best-known beds are near the mouths of the Ambler and Kallarichuk Rivers, tributaries of the Kobuk River, and on Chicago Creek and Buckland and Koyuk Rivers on Seward Peninsula.

YUKON BASIN

Coal occurs throughout the Yukon Basin in small, scattered areas. The largest of these are in basins of Tertiary rocks along the northern flank of the Alaska Range and include the Nenana coal field and the Jarvis Creek coal area. Numerous isolated areas of Tertiary rocks in other parts of the basin contain lignite. Many of these are on or near the Yukon River, particularly east of its junction with the Tanana River; the best-known deposits are near Rampart and on Washington, Coal, and Bonanza Creeks near the Canadian boundary.

At several places throughout the basin, especially west of the junction of the Yukon and Tanana Rivers, bituminous coal has been found in Cretaceous rocks. The deposits along the Yukon River near and downstream from Nulato, at Tramway Bar on the Koyukuk River, and at Chicken near the Fortymile River are the best known. Bituminous coal occurs in Pennsylvanian (?) rocks at the mouth of the Nation River, near the Canadian boundary.

The basin eventually may prove to be an important source of coal, but it has been inadequately explored and little information is available regarding the extent of its coal resources.

NENANA

The Nenana coal field is in the foothill belt north of the Alaska Range. Coal underlies topographic basins that are elongate parallel to the range. It is exposed at many places in a tract about 20 miles wide extending from the Toklat River eastward to the Delta River, a distance of 130 miles; considerable coal has been mined from some of these deposits. The coal-bearing sequence, of Tertiary age, consists of slightly consolidated sands, clays, and gravels, with numerous beds of lignite. The sequence rests unconformably on schist and is overlain in part by the stream-laid Nenana gravel and glacial deposits. The coal-bearing sequence is generally uniform throughout the field.

The coal is high-rank lignite. In the vicinity of the Suntrana mine, on Healy Creek 3½ miles east of its junction with the Nenana River, 250 feet of coal in 23 separate beds has been located in the Tertiary section which is at least 1,900 feet thick; 240 feet of this coal is in the lower two-thirds of the section, comprising 6 beds 20 to 40 feet thick. Most of the coal mined at Suntrana has come from No. 6 bed, although other beds have now been opened. The Roth property 8 miles east of the Suntrana mine contains 21 beds of coal, the largest of which is 48 feet thick. The Diamond mine, on the west side of the Nenana River, 3½ miles southwest of the mouth of Healy Creek, contains a 40-foot bed of lignite, which dips about 35° N. On Lignite Creek, north of Healy Creek, 15 beds of coal total 140 feet in thickness.

Structurally, the coal deposits are in basins down-folded or down-faulted against masses of crystalline rock that separate the basins. The dip in most places does not exceed 15°. In general, the beds in the southern part of the field dip more steeply than elsewhere.

A synclinal coal basin, in part faulted, extends from the Roth property west along Healy Creek to and beyond the Nenana River. It includes the coal at the Roth property, the coal at the Suntrana mine, and probably that at the Diamond mine. On the north side of the syncline the beds dip 70° S. to vertical and on the south side, 30° to 45° N. North of this basin is another large basin that includes the coal along Lignite Creek as well as that around the headwaters of California and Totatlanika Creeks. The beds in this basin dip gently, except near the margins of the basin where they dip as much as 45°.

The chief producing mine in the Nenana field is the Suntrana mine. A spur line connects the mine with the Alaska Railroad.

JARVIS CREEK

An area of a few square miles east of Donnelly, on the Richardson Highway between Fairbanks and Valdez, is underlain by Tertiary coal-bearing rocks. Topographically, it is a ridge about 1,000 feet high, which separates Jarvis Creek from the Delta River. Probably not fewer than 20 beds of coal ranging from a few inches to 20 or more feet in thickness are interbedded with clay and sand. The sequence is several hundred feet thick. Throughout most of the area the beds are nearly horizontal.

COOK INLET-SUSITNA REGION

The Cook Inlet-Susitna region, within the Pacific Mountain system in south-central Alaska, contains some of the most important coal fields in Alaska. The coal deposits of this region are in the large lowland area comprising the Susitna lowland and northwestern Kenai Peninsula; the lowland extends northward through the region in two discontinuous belts of Tertiary rocks which project from it into the bordering mountains. These belts include the Matanuska Valley, extending northeastward and eastward from the head of Cook Inlet, and the Broad Pass depression, extending northward and northeastward parallel to and south of the great arc of the Alaskan Range.

MATANUSKA VALLEY

The Matanuska Valley is a structural and topographic depression between the Talkeetna Mountains on the north and the Chugach Range on the south. It contains the Moose Creek, Eska, Chickaloon, and Anthracite Ridge coal fields. The Moose Creek and Eska fields are often grouped together as the lower Matanuska field; the other fields are farther east in the upper Matanuska Valley.

Lower Matanuska Valley.—The lower Matanuska Valley coal field includes about 12 square miles and is about 45 miles northeast of Anchorage. The coal beds are in the Chickaloon formation of Tertiary age, which consists of alternating beds of sandstone, siltstone, claystone, and coal. The Chickaloon formation is overlain by the Eska conglomerate. The coal in this field is high-volatile bituminous.

Three groups of coal-bearing beds have been recognized. The uppermost group, the top of which is about 120 feet below the base of the Eska conglomerate, is 50 to 60 feet thick and is divided into two parts by 15 to 40 feet of rock. Nos. 2, 3, and 4 beds of the Evan Jones mine are believed to belong to this coal group.

The Premier coal group, the top of which is stratigraphically 140 to 210 feet below the base of the uppermost coal group, is 85 to 210 feet thick and includes 25 to 30 feet of coal. No. 2 bed in the Premier mine, No. 3 bed in the Buffalo mine, No. 1 bed in the Wishbone Hill mine, and No. 4 bed in the Howard & Jesson mine are correlated together as the same bed, which ranges from 7 to 10 feet in thickness and is the thickest bed in Premier coal group. With a few exceptions, the pricipal beds in these mines, as well as those in the Baxter and New Black Diamond mines, are in the Premier coal group. However, No. 5 bed in the Premier mine, No. 1 bed in the Buffalo mine, and Nos. 1 and 2 beds at the Howard & Jesson mine are stratigraphically below the Premier coal group. The No. 0 and No. 00 beds in the Evan Jones mine are believed to be in the upper part of the Premier coal group.

The Eska coal group, the top of which is 250 to 450 feet below the base of the Premier coal group, is 50 to 60 feet thick and contains four prominent beds, which are best exposed in the Eska mine. In this mine the beds of the Eska group in upward succession are the Martin, about 3½ feet thick, the Lower Shaw, about 5 feet thick, the Upper Shaw, about 4 feet thick, and the Eska, 2½ to 6 feet thick.

Several coal beds that have not been identified with any definite coal group have been located in the lower Matanuska Valley coal field and are believed to occur in the stratigraphic interval between the Premier and Eska coal groups. These beds include the Emery in the Eska mine area, Nos. 8 and 9 in the Evan Jones mine, and certain beds along Moose Creek. They are all less than 5 feet thick and are separated by 30 or more feet of sandstone and shale.

The dominant structural feature of the lower Matanuska Valley coal field is an open syncline striking southwestward. The dip of the beds ranges from a few degrees at the axis to nearly 90° in local areas of tight folding and in some faulted blocks. It more commonly ranges from 18° to 50°. Transverse and strike faults are common; the greater displacement is on the transverse faults. Along some faults the horizontal displacement exceeds 300 feet.

The principal producing mines of this field are the Eska and Evan Jones in the eastern part of the field. Some coal has been produced from the Premier, Baxter, Buffalo, New Black Diamond, Wishbone Hill, and Howard & Jesson mines along Moose Creek in the western part of the field. Of the mines along Moose Creek only the Buffalo mine is now producing. Structural disturbance of the coal beds has resulted in higher mining and development costs and in lower recovery of coal, especially lump coal.

Upper Matanuska Valley.—The upper Matanuska Valley coal field occupies most of a rolling upland north of the Matanuska River and extends 20 miles eastward from the Kings River. This tract is underlain by the coal-bearing Chickaloon formation which here consists of a monotonous succession of shale and sandstone, shale predominating. The Chickaloon formation has been invaded by numerous sills and dikes of basic igneous rock.

The field contains high-rank bituminous coking coal and some anthracite. The coal beds are numerous and locally are as much as 10 feet thick, although beds 2 feet thick or less predominate. Individual beds are not extensive and pinch and swell from place to place. The character of the coal varies greatly within short distances. The field has been prospected most thoroughly in the vicinities of Chickaloon and Anthracite Ridge. The beds are complexly folded and faulted, and dips ranging from 50° to 90° are common. Displacement along some of the faults is large.

Mining development and exploration at Chickaloon and Coal Creek by the Navy Alaska Coal Commission showed that the cost of mining would be high owing to complexity of structure and abrupt changes in the character of the coal beds.

BROAD PASS DEPRESSION

The coal deposit at Costello Creek is about 11 miles west of the Alaska Railroad at Broad Pass, approximately halfway between Anchorage and Fairbanks. The coal is subbituminous and occurs in three minable beds in a sequence of slightly consolidated sandstone, siltstone, and conglomerate. In descending order these beds are the Upper "Billie," averaging 4 feet thick, the Lower "Billie," averaging about 3½ feet thick, and the Dunkle, averaging 5 to 6 feet thick. They are slightly warped and in places faulted, but dips are low.

A bed of low-rank lignite several feet thick is known at Broad Pass Station on the railroad.

SUSITNA LOWLAND

The Susitna lowland, which extends northward from near the head of Cook Inlet, is a structural depression between the Alaska Range on the north and west and the Talkeetna Mountains on the east. Southward the lowland broadens and merges with the Matanuska Valley.

Poorly to moderately consolidated beds of sand, clay, conglomerate, and coal of Tertiary age are exposed at numerous places throughout the Susitna lowland. These rocks, generally covered by glacial deposits, probably underlie most of the lowland. Where exposed the beds are horizontal or only gently folded; they range from a few inches to several feet in thickness. The coal is of lignitic and subbituminous rank.

The largest coal-bearing areas known are near Tyonek, on the north shore of Cook Inlet, and near the Yentna River. At Tyonek a thick sedimentary sequence is reported to contain minable lignite in several beds, which in the aggregate are about 50 feet thick. Gently dipping beds of high-rank lignite a few feet thick have been mined at Houston, on the railroad. Lignite has been mined for local use in the Peters Hills near the Yentna River.

KENAI PENINSULA

Most of the northwestern half of the Kenai Peninsula, known as the Kenai lowland, is probably underlain by coal-bearing rocks. The lowland is 20 to 40 miles wide and extends 100 miles southwest from Turnagain Arm, a branch of Cook Inlet. Most of its surface is less than 1,000 feet in altitude.

The coal beds are in the Kenai formation, which probably is to be correlated approximately with the coal-bearing Tertiary rocks of the Susitna and Matanuska Valleys. The Kenai formation consists of partly indurated sands, clays, and lignite. The total measured section of these rocks is 1,800 feet, of which 3 to 5 percent is coal. The coal beds are 3 to 7 feet thick and dip 2° to 4°, 13° being the maximum. Where dips have been observed, the beds in general dip toward the center of the area of Tertiary rocks.

SOUTHWESTERN ALASKA

Coal occurs in several small fields in the Alaska Peninsula. Most of it is subbituminous or lignite, but some at Herendeen Bay is bituminous. Lignitic coal is known in many places in the Kuskokwim Basin; none of the deposits, however, is economically significant.

In the Chignik Bay and Herendeen Bay fields the coal is in the Upper Cretaceous Chignik formation. At Herendeen Bay the Chignik formation in ascending order consists of 200 feet of shale, 300 feet of coal-bearing shale and sandstone, and 300 feet or more of conglomerate. At Chignik Bay the formation consists of sandstone, shale, and some conglomerate, containing thin beds of subbituminous coal near the middle of the section. The beds are broadly folded and are locally faulted.

Thin beds of lignite have been found in gently dipping Tertiary strata on Unga Island, off the south coast of the Alaska Peninsula and in the eastern part of the Herendeen Bay area.

A little coal has been mined at Mine Creek on Herendeen Bay and at various localities around Chignik Bay and on Unga Island.

COPPER RIVER AND ALASKA GULF REGIONS

The Copper River and Alaska Gulf regions are in south-central Alaska between the Cook Inlet-Susitna region and the Canadian border. The coal fields are in Tertiary rocks, a few patches of which occur along the flanks of the Chugach and Wrangell Mountains. The most-important coal fields, however, are near the Pacific coast between Katalla and Yakutat.

BERING RIVER

The Bering River coal field is about 20 miles north of the head of Controller Bay in a mountainous region, the altitudes of which are as much as 3,500 feet. Most of the known outcrops of coal, however, are less than 2,000 feet in altitude. An area of at least 50 square miles is believed to be underlain by coal. The coal is in the Kushtaka formation, consisting of arkose, shale, and sandstone, in addition to the coal. The thickness of the formation exceeds 2,000 feet.

Numerous coal beds are distributed throughout the Kushtaka formation. Most of them are several feet thick, and one is more than 30 feet thick. The coal is semibituminous in the western part of the field and increases in rank to anthracite in the eastern part. The semibituminous coal is good-quality coking coal. The coal is friable and in places is severely crushed, sheared, and squeezed. The structural complexity of the coal field increases from west to east. The beds are folded and faulted and dip steeply. Small dikes and sills, predominantly of basalt, are common, especially in the eastern part of the field.

SOUTHEASTERN ALASKA

In the vicinity of Kootznahoo Inlet on Admiralty Island an area of about 40 square miles is underlain by poorly consolidated Tertiary conglomerate and sandstone containing some lignite or subbituminous coal in small beds. The beds dip moderately and are faulted and folded.

RESERVES

In 1909 G. C. Martin, of the Geological Survey, estimated the minimum reserves of the known coal fields in Alaska at 15,104,500,000 short tons. In 1913 Martin and A. H. Brooks, also of the Survey, published a revised estimate of 19,593,000,000 metric tons (21,597,-000,000 short tons). It was recognized, however, that many times this tonnage ultimately would be found available as the Territory was more thoroughly explored and more detailed information obtained. Reconnaissance work in areas unsurveyed in 1913 and detailed investigations in areas little known in 1913 have disclosed much larger reserves; they now are estimated at nearly 100 billion short tons, of which perhaps 2 billion tons is coking coal. Table 1 summarizes the reserves regionally. Most of the added reserves are in northern Alaska, although moderate tonnages have been mapped in the Cook Inlet-Susitna region and in the south-central part of the Yukon Basin.

Most of the available information has been obtained from reconnaissance surveys and is adequate for indicating only the order of magnitude of the reserves. It is believed that even these revised estimates are conservative and that future surveys will disclose even larger coal reserves in the Territory.

TABLE 1.—*Coal reserves of Alaska*

Region	Lignite and subbituminous coal, short tons	Bituminous coal, short tons	Anthracite, short tons
1. Northern Alaska and Seward Peninsula	60,000,000,000	22,000,000,000	
2. Yukon Basin	5,800,000,000	20,000,000	
3. Cook Inlet-Susitna	3,000,000,000	1,500,000,000	3,000,000
4. Southwestern Alaska	600,000,000	100,000,000	
5. Copper River-Alaska Gulf		1,100,000,000	2,100,000,000
6 Southeastern Alaska	5,000,000		

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PRODUCTION, DISTRIBUTION, AND USE[1]

By C. H. BELL[2] and R. L. ANDERSON[3]

PRODUCTION AND VALUE

Although a small quantity of coal was mined before 1884 from the Cape Lisburne region by crews of whaling vessels and revenue cutters in need of fuel, the first commercial mines worked in Alaska probably were those on the western side of the Kenai Peninsula.

In 1852 the Russian-American Co. undertook the development of mines near Port Graham on Cook Inlet. It abandoned the venture but induced an American company, under Russian charter, to continue the work at Port Chatham. Fuel was supplied for the Russian company's steamers until about the time of the sale of Alaska to the United States in 1867. With the development of the British Columbia, Puget Sound, and other Pacific coast fields, the Alaskan enterprise proved unprofitable and was abandoned.[4]

During the 30 years following acquisition of Alaska by the United States a number of companies were organized to exploit the coal deposits along Cook Inlet and on the Alaska Peninsula. Some coal was mined near Chignik and at Herendeen Bay, but in general little was accomplished either in mining or prospecting.[5]

The attention of prospectors was directed to the Bering River field in 1896 and to the Matanuska field about 2 years later, but the importance of these fields was not realized until after the Geological Survey published reports of its investigations between 1904 and 1908.

The gold rush that followed the discovery of the Klondike placers in 1896 caused a greater demand for local fuel and increased the number of steamers plying the Yukon and its tributaries from 1 or 2 to nearly 100.[6] Several small coal mines were opened along the banks of the Yukon to meet this demand and to supply fuel for river steamers, but oil from California supplanted coal and the mines were abandoned.

A mine was opened in 1903 on Chicago Creek in the northeastern part of Seward Peninsula to supply fuel for neighboring placer camps, and a second one was opened in 1909. Several thousand tons of coal was mined near Bering Lake in 1906–7 for use in railway construction in the vicinity.[7]

[1] Most of the data in this chapter were taken from Mineral Resources of the United States (published annually by the Geological Survey from 1880 to 1923, inclusive, and by the Bureau of Mines from 1924 to 1931, inclusive) and from Minerals Yearbook, published by the Bureau of Mines since 1932.

[2] Economic analyst, Analysis Section, Coal Economics Division, Bureau of Mines.

[3] Assistant chief, Bituminous-Coal Section, Coal Economics Division, Bureau of Mines.

[4] Brooks, A. H., The Coal Resources of Alaska: Geol. Survey Twenty-second Annual Report, 1900-1901, pt. III, pp. 566-568.

[5] Brooks, A. H., The Future of Alaska Mining: Geol. Survey Bull. 714a, 1921, pp. 48-51.

[6] Collier, A. J., The Coal Resources of the Yukon, Alaska: Geol. Survey Bull. 218, 1903, pp. 12-13.

[7] Brooks, A. H., Alaska Coal and Its Utilization: Geol. Survey Bull. 442j, 1910, pp. 47-100.

Before 1916 mining in Alaska was confined to the operation of small mines in scattered localities to supply lignite or subbituminous coal for local needs. Two factors retarded development of the most-important coal deposits, the Bering River and Matanuska fields: (1) Advances in the development of the California oil resources and (2) the coal-land laws.

An Alaskan coal-land law, enacted in 1904, and supplementary legislation, passed in 1908, did not encourage coal-mine development. Coal lands were withdrawn from public entry in 1906; the result was confusion and controversies over the legal status of coal-land claims. A new coal-land leasing law was enacted in 1914 (38 Stat. 741), and the Department of the Interior issued pursuant regulations in 1916 to govern the leasing of coal lands.[8]

In the meantime, however, the market for coal had dropped because of the increasing use of petroleum. Unsettled financial conditions prevailed, brought about by World War I. Capital had no desire to make large investments in the development of Alaska coal resources, while on the other hand industrial fuel consumers were reluctant to make commitments with uncertain sources of coal supply. Even private railroad projects were abandoned. As a result the Federal Government was forced to enter the field of railroad construction and to undertake the exploration and development of coal resources.

In 1916 the Alaskan Engineering Commission extended a branch of the Alaska Railroad into the heart of the Matanuska field and later acquired coal properties in the Eska Creek district, which it operated in 1917. In 1918 the coal lands of the Nenana field were offered for lease, and in 1922 the Healy mine became a commercial producer. The Evan Jones mine in the Matanuska field was being developed in 1920 and became a producer in 1921. These two mines have been the principal sources of Alaska coal, although many small mines have been in operation from time to time and the Eska mine of the Alaska Railroad Commission was kept in stand-by condition to assure an adequate fuel supply for the railroad.

Alaska's coal requirements increased markedly after 1941 because of wartime activities. To meet these demands as nearly as feasible with Alaska coal, a military commission was sent to Alaska to investigate its coal resources and to stimulate production. The Moose Creek district of the Matanuska field, which offered great promise, was explored extensively by the Bureau of Mines.[9]

Table 2 shows the annual average production and value of coal produced in Alaska for the periods 1880–90, 1891–95, and 1896–1900 and the production and value by years from 1901 to 1944.

The data on value do not reflect the commercial value of the coal because a large part of the production is purchased under contract by the Alaska Railroad at a lower price than the coal commands in the open market.

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[8] U. S. Department of the Interior, Regulations Governing Coal-Land Leases in the Territory of Alaska: 1916.

[9] Apell, G. A., Moose Creek District of the Matanuska Coal Fields of Alaska: Bureau of Mines Rept. of Investigations 3784, 1944, 36 pp.

TABLE 2.—*Production and value of coal, f.o.b. mines, in Alaska*

Year	Production, net tons	Value	Average value per ton at mines	Year	Production, net tons	Value	Average value per ton at mines
1880–1890 [1]	608	$3,720	$6.12	1922	79,275	$430,639	$5.43
1891–1895 [1]	1,010	5,762	5.70	1923	119,826	755,469	6.30
1896–1900 [1]	2,231	24,169	10.83	1924	99,663	559,980	5.62
1901	2,740	29,843	10.89	1925	82,868	404,617	4.88
1902	3,052	22,508	7.37	1926	87,300	459,000	5.26
1903	2,717	21,302	7.84	1927	104,300	548,000	5.25
1904	1,824	8,195	4.49	1928	126,100	662,000	5.25
1905	4,334	15,070	3.48	1929	100,600	528,000	5.25
1906	6,061	19,924	3.29	1930	120,100	631,000	5.25
1907	10,689	55,770	5.22	1931	105,900	556,000	5.25
1908	4,066	22,665	5.57	1932	102,700	514,000	5.00
1909	3,430	16,350	4.77	1933	96,467	481,000	4.99
1910	2,250	13,200	5.87	1934	107,508	451,000	4.20
1911	1,850	11,690	6.32	1935	119,425	502,000	4.20
1912	1,205	7,130	5.92	1936	136,593	574,000	4.20
1913	2,312	13,290	5.75	1937	131,657	553,000	4.20
1914	1,190	6,540	5.50	1938	154,682	814,000	5.26
1915	1,629	6,653	4.08	1939	148,417	419,000	2.82
1916	12,676	57,412	4.53	1940	173,844	607,000	3.49
1917	54,275	268,438	4.95	1941	238,960	944,000	3.95
1918	75,816	413,870	5.46	1942	260,893	1,623,000	6.22
1919	60,894	345,617	5.68	1943	289,232	1,842,000	6.37
1920	61,111	355,668	5.82	1944 [2]	352,000	2,288,000	6.50
1921	76,817	496,394	6.46				

[1] Yearly average.
[2] Preliminary.

Table 3 shows data on production, men employed, days active, man-days worked, and output per man per day for the years 1934–44 at coal mines in Alaska.

TABLE 3.—*Production, men employed, days active, man-days worked, and output per man per day at coal mines in Alaska, 1934–44*

[Exclusive of mines producing less than 1,000 tons]

Year	Number of mines	Disposition of coal produced, net tons				Average number of employees			Average number of days mines were active	Number of man-days worked	Average tons per man per day
		Loaded for shipment by rail	Shipped by truck or wagon and used by mine employees	Used at mine for power and heat	Total	Underground	All others	Total			
1934	4	101,060	5,370	1,078	107,508	56	37	93	217	20,181	5.33
1935	4	112,260	5,971	1,194	119,425	60	35	95	249	23,615	5.05
1936	3	128,397	6,830	1,366	136,593	64	47	111	245	27,208	5.02
1937	4	128,608	4	3,251	[1] 131,657	(2)	(2)	123	207	25,461	5.16
1938	6	151,656	231	2,795	154,682	100	44	144	204	29,413	5.26
1939	8	143,549	10	3,305	[1] 148,417	66	22	88	289	25,396	5.84
1940	3	170,174	....	3,670	173,844	70	28	98	322	31,541	5.51
1941	3	235,230	....	3,730	238,960	110	43	153	311	47,617	5.02
1942	7	242,725	8,553	9,615	260,893	183	65	248	299	74,064	3.52
1943	5	268,543	4,108	16,581	289,232	172	79	251	321	80,564	3.50
1944 [3]	(2)	(2)	(2)	(2)	352,000	(2)	(2)	(2)	(2)	(2)	(2)

[1] The total production differs from the sum of the items shown by the amount of the changes in inventory.
[2] Data not available.
[3] Preliminary.

PRODUCTION OF MECHANICALLY CLEANED COAL

Table 4 shows the tonnage of mechanically cleaned coal produced in Alaska for the years 1939–43. During 1943 more than one-third of the total production of Alaska coal mines was cleaned, as compared with less than one-fourth of the total output of all bituminous-coal mines in the United States.

For every 100 tons of raw coal cleaned in Alaska during 1943, 70.1 tons of clean merchantable coal was obtained and 29.9 tons of refuse was discarded; comparable 1943 data for all bituminous-coal mines in the United States were 86.5 tons of clean merchantable coal and 13.5 tons of refuse.

TABLE 4.—*Production of coal mechanically cleaned in Alaska, 1939 to 1943, inclusive*

Year	Output mechanically cleaned, net tons	Percent of total production mechanically cleaned	
		Alaska	Total United States
1939	52,754	35.5	20.1
1940	64,567	37.1	22.2
1941	69,665	29.2	22.9
1942	73,417	28.1	24.4
1943	100,780	34.8	24.7

USES

Table 5 shows the sources of coal consumed in Alaska from 1899 to 1943, inclusive. After the outbreak of the war in December 1941, Alaska was designated a military area, and there was a large influx of men and material into the Territory. Coal consumption, which approximated 200,000 tons per year before the war, increased notably, and the requirements for the 1943–44 season were estimated as approximately 500,000 tons.

TABLE 5.—*Sources of coal consumed in Alaska, 1899–1943, in net tons*

Year	Produced in Alaska	Imported from United States, chiefly from Washington	Total foreign coal, chiefly from British Columbia	Total coal consumed	Year	Produced in Alaska	Imported from United States, chiefly from Washington	Total foreign coal, chiefly from British Columbia	Total coal consumed
1899	2,264	10,000	[1] 50,120	62,384	1922	79,275	28,457	34,251	141,983
1900	2,855	15,048	[1] 56,623	74,526	1923	119,826	34,082	43,205	197,113
1901	2,740	24,000	[1] 77,674	104,414	1924	99,663	40,161	41,980	181,804
1902	3,052	40,000	[1] 68,363	111,415	1925	82,868	37,324	57,230	177,422
1903	2,717	64,626	[1] 60,605	127,948	1926	87,300	35,620	34,254	157,174
1904	1,824	36,689	[1] 76,815	115,328	1927	104,300	39,437	30,492	174,229
1905	4,334	67,713	[1] 72,612	144,659	1928	126,100	39,408	32,518	198,026
1906	6,061	69,493	[1] 47,590	123,144	1929	100,600	36,693	27,073	164,366
1907	10,689	46,246	[1] 93,262	150,197	1930	120,100	37,128	23,892	181,120
1908	4,066	23,893	[1] 86,404	114,363	1931	105,900	30,772	17,796	154,468
1909	3,430	33,112	69,046	105,588	1932	102,700	28,422	13,959	145,081
1910	2,250	32,098	58,420	92,768	1933	96,467	21,524	14,009	132,000
1911	1,850	32,255	61,845	95,950	1934	107,508	28,317	14,675	150,500
1912	1,205	27,767	68,316	97,288	1935	119,425	26,554	15,707	161,686
1913	2,312	69,066	56,430	127,808	1936	136,593	27,643	11,806	176,042
1914	1,190	41,509	46,153	88,852	1937	131,657	24,562	10,781	167,000
1915	1,629	46,329	29,457	77,415	1938	154,682	23,465	11,634	189,781
1916	12,676	44,934	53,672	111,282	1939	148,417	17,587	8,163	174,167
1917	54,275	58,116	56,589	168,980	1940	173,844	14,794	6,339	194,977
1918	75,816	51,520	37,986	165,322	1941	238,960	21,805	4,291	265,056
1919	60,894	57,166	48,708	166,768	1942	260,893	9,812	9,763	280,468
1920	61,111	38,128	45,264	144,503	1943	289,232	11,269	33,349	333,850
1921	76,817	24,278	33,776	134,871					

[1] Fiscal year ending June 30.

The coal industry of Alaska began to expand in 1916 when the Government-owned Alaska Railroad was extended to the coal fields; the railroad has been the principal consumer of coal in Alaska. The mine of the Evan Jones Coal Co., the Healy mine of the Healy River Coal Corporation at Suntrana, and recently the Eska mine of the Alaska Railroad have been the principal sources of fuel for the railroad. Coal from the Healy and Nenana districts is used to generate power for the city of Fairbanks and the extensive nearby dredging operations.

The development of the Alaskan coal industry has been hampered by such difficulties as unfavorable climatic conditions; lack of adequate transportation, storage, and handling facilities; uncertain markets; high development and mining costs; and a scarcity of skilled workers. It is possible that the impetus given the industry by the current increased demands will be sustained and that future growth in population and industrial production will result in a stable and prosperous coal-mining industry in Alaska.

RELATIONSHIP OF MINE SAMPLES TO COMMERCIAL SHIPMENTS

By N. H. Snyder[1]

Analyses of coal samples have little or no value unless the method of collecting and preparing the samples is clearly understood. Two kinds of samples are in ordinary use—mine or face samples and samples of coal as shipped or delivered. The former are prepared primarily for mine operators and the latter for purchasers and consumers. There is a distinct difference in the method of collecting the two kinds of samples that must be realized to permit interpretation of the resulting analyses. To explain this difference, the method of collecting them will be described briefly. Mine samples are collected according to the standard method adopted by the Bureau of Mines[2] and the Geological Survey, whereas delivered samples[3] are collected according to the American standard method adopted by the American Society for Testing Materials and approved by the American Engineering Standards Committee.

METHOD OF COLLECTING MINE SAMPLES

In mine sampling enough working places must be selected in the mine so that when analyses of all the face samples are determined the resulting average will be a fair measure of the quality of all the coal in that particular mine relatively free of impurities. There is no definite rule as to how many samples should be collected for a mine, as that depends on local conditions, such as variability of the bed, concentration of mine workings, and output. The general rule[4] followed by the Bureau is to collect "from any mine that is shipping coal not less than three samples * * * and the number to be taken should increase with increase in the daily output of the mine—not less than three samples for outputs up to a daily average of 300 tons, four samples for average outputs of 300 to 500 tons, five samples for outputs of 500 to 1,000 tons, six samples for outputs of 1,000 to 1,500 tons." A single face sample of a commercial mine cannot be considered of any great value, as it may have been cut from the best or worst coal in the mine.

At each selected place the face is cleared of powder, dirt, and loose coal; insecure fragments of the roof are taken down; and the floor is cleaned. From this thoroughly cleaned face a channel is cut from roof to floor. The channel should be 2 inches deep and 6 inches wide (or 3 inches deep and 4 inches wide in the softer coals). As the coal is cut it falls on a clean piece of canvas or oilcloth. The sampler

[1] Supervising engineer, Fuel-Inspection Section, Bureau of Mines.
[2] Holmes, J. A., The Sampling of Coal in the Mine: Bureau of Mines Tech. Paper 1, 1918, 17 pp.
[3] Pope, G. S., Directions for Sampling Coal for Shipment or Delivery: Bureau of Mines Tech. Paper 133, 1917, 15 pp. (Revised in 1933 by N. H. Snyder; 8 pp.)
[4] Holmes, J. A., Work cited

eliminates from the sample partings of shale, bone, and pyrite ⅜ inch or thicker and lenses or concretions of pyrite or other impurities more than 2 inches in maximum diameter or ½ inch in thickness. The sample is cut to include only those parts of the bed that a reasonably careful miner would load. The coal thus cut from the channel is crushed, mixed, and quartered and placed in a sample container that holds about 3 pounds. This container is completely filled and sealed in the mine.

A mine sample therefore tends to represent the best quality of coal that can be produced. The sampler is much more careful in excluding impurities in the bed of coal than the miner is when he is loading coal. Furthermore, all impurities arising from roof and floor conditions are eliminated from the sample. When the miner loads coal he is not as careful to keep out small pieces of shale that fall from the roof or impurities from a soft or flaky floor. As mine samples usually are collected only from a small proportion of the total number of working places, their analyses represent only a limited part of the coal immediately available for shipment.

If enough face samples are cut according to the rule given and if these cover the area of the mine fairly well, they generally can be considered reliable in showing the quality of the coal in the mine. If one remembers that the purpose of face samples is to show the best quality of coal that a mine can produce under ideal conditions, he can judge the value of the analyses.

METHOD OF SAMPLING COAL FOR SHIPMENT OR DELIVERY

Samples of coal for shipment or delivery are taken after the coal has been mined and has received its customary cleaning. It may be sampled at the mine as it is being loaded into railroad cars or trucks for shipment or at the point of delivery as it is being unloaded. The samples are collected according to the American standard method.[5] The method of preparing such a sample is to collect for lump or run-of-mine coal not less than 1,000 pounds taken systematically in equal increments at regular intervals throughout the shipment or delivery. For ¾-inch slack or smaller sizes not less than 500 pounds is required. The coal collected is crushed, mixed, and quartered in successive stages to laboratory size for analysis. The final sample mailed to the laboratory should weigh not less than 5 pounds and should be crushed to less than 4-mesh size. When the increments of run-of-mine coal are collected care should be taken that the percentage of sizes in the sample is the same as the percentage in the shipment. Impurities such as shale, bone, and pyrite, which may be included in the increments as they are collected, should not be thrown out but should be finely crushed and included in the gross sample. Nothing is thrown out of the sample; but care must be taken that no foreign matter, such as cinders and dirt, gets into the coal sample as it is being prepared.

The analysis of a sample so collected is therefore representative of the actual product shipped by the mine when the sample was collected. In using analyses of samples of delivered coal one must recog-

[5] Pope, G. S., Work cited.

nize that coal is not always of uniform size and that the impurities are not distributed uniformly throughout the mass. Hence, there will be some variation in the results of sampling, and even though the same mass of coal was sampled a number of times the analyses would not agree absolutely except by chance. Only when a large number of analyses representing a considerable tonnage mined over a period of time are available do the average value and range of variation of a particular coal become known with certainty.

The reliability of a sample of coal as shipped or delivered depends entirely on the sampler. If less than the required gross sample is collected, the result is likely to be wrong. If the sampler is prejudiced in favor of either the buyer or the seller, if he does not take the increments to represent the gross tonnage fairly as to size and impurities, or if he does not follow correct instructions explicitly, the analysis resulting from the sample will be of little value.

COMPARISON OF RESULTS OBTAINED BY TWO METHODS OF SAMPLING

The average or composite analysis of a number of face samples, almost without exception, will show a lower percentage of ash than the analysis of a sample of run-of-mine coal from the same mine. The reason for this difference is that a miner, interested in producing a large tonnage, shovels the coal in a hurry and is likely to load out impurities that a trained sampler would exclude. A sampler excludes any impurities from the roof and floor and certain impurities from the bed because he has no criteria to determine whether or not such impurities will get into the coal and, if so, how great an amount. In the processes of mining, blasting, and loading the coal such impurities do get into the coal. The amount of these impurities removed depends on the method of mining, type of tipple equipment, discipline of loaders, and other factors.

Where a mine has a tipple equipped to prepare and grade the coal into various sizes one or more of the sizes may contain less ash than the average or composite face samples. However, if each size is sampled and a weighted average is computed on the basis of the percentage of each size produced, this weighted average usually will show a higher percentage of ash than the face samples.

INTERPRETATION OF SAMPLING RESULTS

Face samples measure the coal as it lies in the bed. Samples of coal as shipped or delivered measure the product as mined and commercially shipped. The former are fairly constant and form a permanent record of the quality of coal at the point of sampling, but the latter are variable and change from time to time because of the following factors:

1. Development of new areas in the mine of better or poorer coal.
2. Opening of new beds of different quality.
3. Increase or decrease in supervision and discipline of coal loaders.
4. Development of more-efficient tipples for cleaning coal, either manually or mechanically.
5. Changes in mining methods.
6. Market demand and price of coal.

The sample of coal as shipped or delivered is of greatest value to the consumer. Both types of samples give valuable information to a coal-mine operator in helping him to determine the quality of coal that a mine can produce and what it is actually producing. The closeness with which the quality of the shipped or delivered coal approaches that of the mine sample is a measure of the efficiency of preparation.

The analyses of tipple and delivered samples in table 8 (p. 26) indicate more nearly what consumers are likely to receive. In judging these records careful consideration should be given the following factors:

1. Year of delivery.
2. Amount of coal sampled.
3. Number of analyses made.

Obviously, a number of analyses made recently on a large tonnage are more valuable than a single analysis made some time ago on a small tonnage. The single analyses made on the tipple samples are an exception, as they were taken by trained samplers in strict accordance with the "standard method" and can be considered very reliable.

Although information on analyses of shipped or delivered coal for Alaska mines is not complete, it will give purchasers of Alaska coals an idea of the character of coal they are likely to get. If purchase of coal from a given mine for which there are no reliable analyses as to the quality produced is being considered, these tables should aid in forming an opinion; the following information should be available:

1. Location of mine by town and county.
2. Bed being mined.
3. Average section of bed showing impurities and character of roof, draw slate, and floor.
4. Tipple equipment.

If these factors are known, the approximate quality of coal produced can be determined by reference to the table of analyses given in this paper. Mines in the same locality working the same bed generally produce about the same quality of coal, unless conditions are unusual.

If those who purchase or sell coal will realize that mine samples are likely to indicate coal of slightly better grade than average commercial shipments, considerable trouble will be avoided in settling for coal delivered on contracts involving a penalty if the coal is below the quality guaranteed. Bids on such contracts should not be based solely upon mine samples but upon samples from shipments of the same size, mined and prepared under conditions that can be maintained during the life of a contract. Published analyses of coal, advertised or reported, that do not indicate plainly whether the samples were mine, shipped, or delivered, what they represent, who collected them, and who analyzed them cannot be regarded as reliable in determining the quality of coal to be shipped. Because of the many conditions that affect the mining and preparation of coal, an allowance based upon experience must be made between the quality of coal in the mine and that as it reaches the consumer.

ANALYSES OF MINE, TIPPLE, AND DELIVERED SAMPLES

By H. M. Cooper,[1] N. H. Snyder,[2] R. F. Abernethy,[3] E. C. Tarpley,[4] and R. J. Swingle[5]

EXPLANATION OF TABLE OF ANALYSES

The analyses in table 8 are arranged geographically with respect to regions[6] and alphabetically with respect to location in the region. The location in the region may be determined by distance and direction from a town, creek, river, mountain, road, or trail. The analyses are grouped as follows:

1. Proximate analysis—moisture, volatile matter, fixed carbon, and ash.
2. Ultimate analysis—sulfur, hydrogen, carbon, nitrogen, oxygen, and ash.
3. Softening temperature of ash, when such determinations were made.
4. Agglomerating index, when such tests were made.
5. Mineral-matter-free basis:
   (a) Dry fixed carbon and B. t. u.
   (b) Moist B. t. u.

Ultimate analyses and B. t. u. for mine samples are given for three conditions, as follows: (1) As-received, (2) moisture-free, and (3) moisture- and ash-free. Proximate analyses and B. t. u. for tipple and delivered samples are given for two conditions: As received and moisture-free.

The as-received condition represents the sample as received at the laboratory and for mine samples may approximate closely the condition of the coal in the mine; the moisture-free condition represents the composition and heating value of the dry coal; the moisture- and ash-free condition approximates the composition and heating value of the dry combustible matter.

The analyses are given to the nearest 0.1 percent and the British thermal units to the nearest 10, although the laboratory determinations are recorded to the nearest 0.01 percent and the nearest British thermal unit.

DIFFERENCES IN VOLATILE-MATTER AND FIXED-CARBON DETERMINATIONS

Before 1913 the methods for determining volatile matter and fixed carbon were not standard with respect to temperature; consequently, determinations made before this date are not comparable because the work was done in three different laboratories under four different sets of temperature conditions.

Group 1, analyzed before April 1907, laboratory Nos. 1 to 5146,

[1] Senior chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.
[2] Supervising engineer, Fuel-Inspection Section, Bureau of Mines, Washington, D. C.
[3] Chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.
[4] Associate chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.
[5] Senior scientific aide, Fuel-Inspection Section, Bureau of Mines, Washington, D. C.
[6] Smith, P. S., Areal Geology of Alaska: Geol. Survey Prof. Paper 192, 1939, pp. 2–3.

inclusive.—These determinations were made in the St. Louis laboratory, where gasoline gas was used for fuel.

Group 2, analyzed between September 1907 and March 1909, laboratory Nos. 5147 to 7100, inclusive.—These determinations were made while the laboratory was in the Carnegie Technical Schools, Pittsburgh, Pa., where natural gas was used as fuel. There is no record of the pressure at which the natural gas was supplied to the burners, but it probably was about 10 inches of water.

Group 3, analyzed between March and October 1909, laboratory Nos. 7101 to 9120, inclusive.—These determinations were made after removal of the laboratory to Fortieth and Butler Streets, Pittsburgh, Pa., where natural gas was used for fuel. While determinations were being made in this group the pressure of the gas at the burners was low and caused much trouble. It fluctuated between 1½ and 5 inches of water, apparently varying with the demands of certain industrial establishments that were taking gas from the same main.

Group 4, analyzed between October 1909 and February 1913, laboratory Nos. 9121 to 16100, inclusive.—These determinations were made under the same conditions as those in group 3, except that the pressure of the gas at the burners was kept at 10 to 14 inches of water. By using a Tyrell burner and a polished platinum crucible a temperature of about 880° C. was maintained in the interior of the coke at a point about 2 mm. from the bottom of the crucible.

Since February 1913 all volatile-matter determinations have been run in an electric furnace at 950° C.

During the fall of 1917 the laboratory was moved from Fortieth and Butler Streets to the present location, 4800 Forbes Street, Pittsburgh, Pa., where the use of the electric volatile furnace at 950° C. is still continued.

Comparison of analyses of various groups.—Comparison of analyses of samples from the same mine show that the volatile-matter and fixed-carbon determinations of groups 1 and 4 agree fairly closely; the variations are both plus and minus and as a rule within 1 percent. The determinations of group 3, however, are distinctly lower in volatile matter and higher in fixed carbon than are those of groups 1 and 4. The differences are about 3 percent for low-volatile bituminous coals and anthracite and decrease gradually, as the volatile matter in the coal increases, to about 1 percent for bituminous coals. The volatile-matter determinations made while the laboratory was in the Carnegie Technical Schools (group 2) fall about midway between the determinations made at the St. Louis laboratory (group 1) and those made with natural gas under low pressure (group 3).

CLASSIFICATION OF COAL BY RANK

The unweathered mine samples have been classified by rank, that is, according to their degree of metamorphism or progressive alteration in the natural series from lignite to anthracite. This classification conforms to the Standard Specifications for Classification of Coals by Rank (D 388–38) of the American Society for Testing Materials.[7]

[7] American Society for Testing Materials, Standard Specifications for Classification of Coals by Rank (A. S. T. M. Designation: D 388-38; A. S. A. M20.1-1938): A. S. T. M. Standards, 1939, pt. III, pp. 1-6.

A coal containing more than 69 percent of dry, mineral-matter-free fixed carbon is classified according to fixed carbon; but one containing less than 69 percent is classified according to moist, mineral-matter-free B. t. u. Weathering and agglomerating properties are used to differentiate between certain adjacent groups.

Four different methods were used in determining the volatile matter on samples 1 to 16,100; consequently, the classification will vary and may be in slight error.

Table 6 shows the several divisions of coal classification.

TABLE 6.—*Classification of coals by rank*[1]

[Legend: FC = fixed carbon. VM = volatile matter. B. t. u. = British thermal units]

Class	Group	Limits of fixed carbon or B. t. u., mineral-matter-free basis	Requisite physical properties
I. Anthracitic	1. Meta-anthracite	Dry FC, 98 percent or more (dry VM, 2 percent or less).	
	2. Anthracite	Dry FC, 92 percent or more and less than 98 percent (dry VM, 8 percent or less and more than 2 percent).	
	3. Semianthracite	Dry FC, 86 percent or more and less than 92 percent (dry VM, 14 percent or less and more than 8 percent).	Nonagglomerating.[2]
II. Bituminous[3]	1. Low-volatile bituminous coal.	Dry FC, 78 percent or more and less than 86 percent (dry VM, 22 percent or less and more than 14 percent).	
	2. Medium-volatile bituminous coal.	Dry FC, 69 percent or more and less than 78 percent (dry VM, 31 percent or less and more than 22 percent).	
	3. High-volatile A bituminous coal.	Dry FC, less than 69 percent (dry VM, more than 31 percent); and moist[4] B. t. u., 14,000[5] or more.	
	4. High-volatile B bituminous coal.	Moist[4] B. t. u., 13,000 or more and less than 14,000.[5]	
	5. High-volatile C bituminous coal.	Moist B. t. u., 11,000 or more and less than 13,000.[5]	Either agglomerating or nonweathering.[6]
III. Subbituminous	1. Subbituminous A coal.	Moist B. t. u., 11,000 or more and less than 13,000.[5]	Both weathering and nonagglomerating.
	2. Subbituminous B coal.	Moist B. t. u., 9,500 or more and less than 11,000.[5]	
	3. Subbituminous C coal.	Moist B. t. u., 8,300 or more and less than 9,500.[5]	
IV. Lignitic	1. Lignite	Moist B. t. u., less than 8,300	Consolidated.
	2. Brown coal	Moist B. t. u., less than 8,300	Unconsolidated.

[1] This classification does not include a few coals that have unusual physical and chemical properties and that come within the limits of fixed carbon or B. t. u. of the high-volatile bituminous and subbituminous ranks. All of these coals either contain less than 48 percent dry, mineral-matter-free fixed carbon or have more than 15,500 moist, mineral-matter-free B. t. u.

[2] If agglomerating, the coal is classified in low-volatile group of bituminous class.

[3] It is recognized that there may be noncaking varieties in each group of the bituminous class.

[4] Moist B. t. u. refers to coal containing its natural bed moisture but not including visible water on the surface of the coal.

[5] Coals containing 69 percent or more fixed carbon on the dry, mineral-matter-free basis shall be classified according to fixed carbon, regardless of B. t. u.

[6] There are three varieties of coal in the high-volatile C bituminous-coal group, namely: (1) Agglomerating and nonweathering; (2) agglomerating and weathering; (3) nonagglomerating and nonweathering.

The method of calculating to mineral-matter-free basis is given below:

Parr[8] formulas:

$$\text{Dry, Mm-free FC} = \frac{FC - 0.15\,S}{100 - (M + 1.08\,A + 0.55\,S)} \times 100 \qquad (1)$$

[8] Parr, S. W., The Classification of Coal: Illinois Eng. Exp. Sta. Bull. 180, 1928, 62 pp.

$$\text{Moist, Mm-free B. t. u.} = \frac{\text{B. t. u.} - 50\ S}{100 - (1.08\ A + 0.55\ S)} \times 100 \quad (2)$$

where:

Mm—mineral matter,
B. t. u.—British thermal units,
FC—percentage of fixed carbon,
M—percentage of moisture,
A—percentage of ash,
S—percentage of sulfur.
"Moist" refers to coal containing its natural bed moisture but not including visible water on the surface of the coal.

The as-received analysis, or the analysis of the coal as it is in the coal bed, is used in these formulas.

An information circular[9] on the use of formulas and curves for convenient determination of the classification of coals has been issued by the Bureau of Mines.

AGGLOMERATING INDEX

The agglomerating index is a rough indication of the caking properties of coal. It is determined by visual and physical examination of the residue from the standard volatile-matter determination. All coals analyzed since November 15, 1934 (laboratory No. B300), have been classified according to agglomerating properties in accordance with the following table:

TABLE 7.—*Agglomerating properties of coals based upon examination of residue incident to the volatile-matter determination*[1]

Designation		Appearance of residue from standard method for determination of volatile matter in coal
Class	Group	
Nonagglomerating[2] (button shows no swelling or cell structure and will not support a 500-gram weight without pulverizing).	NA—Nonagglomerate	NAa—Noncoherent residue. NAb—Coke button shows no swelling or cell structure and after careful removal from the crucible will pulverize under a 500-gram weight carefully lowered on button.
Agglomerating[2] (button shows swelling or cell structure or will support a 500-gram weight without pulverizing).	A—Agglomerate (button dull black, sintered, shows no swelling or cell structure. Will support a 500-gram weight without pulverizing).	Aw—Weak agglomerate (button comes out of crucible in more than 1 piece). Af—Firm agglomerate (button comes out of crucible in 1 piece).
	C—Caking (button shows swelling or cell structure).	Cp—Poor caking (button shows slight swelling, with small cells; has slight gray luster). Cf—Fair caking (button shows medium swelling and good cell structure; has characteristic metallic luster). Cg—Good caking (button shows strong swelling and pronounced cell structure, with numerous large cells and cavities; has characteristic metallic luster).

[1] Based upon Agglomerating and Agglutinating Tests for Classifying Weakly Caking Coals, by R. E. Gilmore, G. P. Connel, and J. H. H. Nicolls: Trans. Am. Inst. Min. and Met. Eng., Coal Div., vol. 108, 1934, pp. 255–265.

[2] Agglomerating index—coals that in the volatile-matter determination produce either an agglomerate button that will support a 500-gram weight without pulverizing or a button showing swelling or cell structure shall be classified as agglomerating.

[9] Barkley, J. F., and Burdick, L. R., Curves for the Classification of Coal: Bureau of Mines Inf. Cir. 6933, 1937, 6 pp.

SOURCES OF INFORMATION

The analyses in table 8 comprise those taken from Bureau of Mines Bulletins 22, 85, 123, and 193 and later analyses made before April 1, 1945, which are published here for the first time. Most of the analyses credited to Bureau of Mines Bulletin 22 were made under the direction of the Technologic Branch, Geological Survey, at the coal-testing plant, St. Louis, Mo. They were published in various Geological Survey reports and later incorporated in Bulletin 22. The analyses of delivered coal, index numbers 1 to 129, inclusive, and mine samples, laboratory numbers preceded by "X," were made by M. L. Sharp at Anchorage, Alaska. All other analyses were made in the laboratory of the Bureau of Mines at Pittsburgh, Pa.

The samples were taken by representatives of the Geological Survey, Bureau of Mines, Navy Department, and Alaskan Engineering Commission. The name and affiliation of the sampler is given under Description of Mine Samples (p. 70).

Analyses of samples bearing laboratory numbers 1 to 7100 were made in accordance with procedures[10] employed at the coal-testing plant at St. Louis. The remainder of the analyses were made by procedures outlined in Bureau of Mines Technical Paper 8.[11]

SIZE DESIGNATION OF DELIVERED COAL

The various sizes of delivered coal are specified as follows in Form 1177, Standard Alaska Railroad Purchase Conditions:

Lump—plus-3-inch round-hole screen.
Lump nut—plus-1-inch round-hole screen.
Nut—minus-3-inch and plus-1-inch round-hole screen.
Chestnut—minus-1-inch round-hole, plus-¼-inch-mesh screen.
Locomotive—not less than 40 percent retained on 1-inch round-hole screen.
Steam—through 1-inch round-hole screen, not more than 40 percent through ¼-inch-mesh screen.

FUSIBILITY OF ASH

Three critical temperatures are observed in the process of melting the test cone in the fusibility-of-ash determination. The first, or initial deformation temperature, is defined as the temperature at which the apex of the cone begins to round or melt; it is lower than the second critical point, or softening temperature. The softening temperature, often called the fusion temperature, is that temperature at which the cone has fused down to a spherical lump; it is lower than the fluid temperature, the third critical point. The fluid temperature is that temperature at which the molten mass spreads out into a flat layer over the refractory base holding the cone. These temperatures are determined by prescribed methods in a test furnace in which the cones are surrounded by a slightly reducing atmosphere.

The most important of these three temperatures is the second, or

[10] Geological Survey, Report on the Operations of the Coal-Testing Plant of the United States Geological Survey at the Louisiana Purchase Exposition, St. Louis, Mo., 1904: Prof. Paper 48, 1906, pp. 174–192.
[11] Stanton, F. M., and Fieldner, A. C., Methods of Analyzing Coal and Coke: Bureau of Mines Tech. Paper 8, 1912, 42 pp. (Revised in 1913, 1926, 1929, and 1938 by F. M. Stanton, A. C. Fieldner, and W. A. Selvig.)

softening, temperature. In general, the softening temperatures of ash range from 1,800° to 3,100° F. and are classified as follows:

Class I. Refractory ash, softening above 2,600° F.
Class II. Medium-fusible ash, softening between 2,200° and 2,600° F.
Class III. Easily fusible ash, softening below 2,200° F.

The ash from most coals of Alaska falls in class II or class III, softening below 2,600° F.

The actual temperatures observed for individual samples are given in columns 21, 22, and 23 of table 8.

EXPLANATION OF SYMBOLS USED IN TABLE OF ANALYSES

Rank (column 3, table 8):
- An—anthracite.
- Sa—semianthracite.
- Lvb—low-volatile bituminous.
- Mvb—medium-volatile bituminous.
- Hvab—high-volatile A bituminous.
- Hvbb—high-volatile B bituminous.
- Hvcb—high-volatile C bituminous.
- Suba—subbituminous A.
- Subb—subbituminous B.
- Subc—subbituminous C.
- Lig—lignite.

Agglomerating index (column 7, table 8):
- NAa—noncoherent residue.
- NAb—coherent residue.
- Aw—weak agglomerate.
- Af—firm agglomerate.
- Cp—poor caking.
- Cf—fair caking.
- Cg—good caking.

Mineral-matter-free basis (formulas used in calculating values in columns 24, 25, and 26, table 8):

Dry, mineral-matter-free fixed carbon =

$$\frac{\text{Fixed carbon} - 0.15\ \text{sulfur}}{100 - (\text{moisture} + 1.08\ \text{ash} + 0.55\ \text{sulfur})} \times 100.$$

$$\text{Moist, mineral-matter-free B. t. u.} = \frac{\text{B. t. u.} - 50\ \text{sulfur}}{100 - (1.08\ \text{ash} + 0.55\ \text{sulfur})} \times 100.$$

Dry, mineral-matter-free B. t. u. =

$$\frac{\text{B. t. u.} - 50\ \text{sulfur}}{100 - (\text{moisture} + 1.08\ \text{ash} + 0.55\ \text{sulfur})} \times 100.$$

TABLE 8.—*Analyses of mine,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
NORTHERN ALASKA REGION								
Ikpikpuk River:								
Outcrop				M	1 2		70	A6849
Do				M	1 2			A6847
Kiana: Outcrop				M	1 2 3		71	A52083
Killik River: Outcrop				M	1 2		71	A6848
Kukpowruk River:								
Outcrop				M	1 2		71	[6]96820
Do				M	1 2			96821
Meade River:								
Meade River				M	1 2 3	NAa	71	[6]C27944
Meade River prospect.				M	1 2 3	NAa	71	[6]C27945
Peard Bay:								
Outcrop				M	1 2 3	NAa	71	[6]C27946
Prospect				M	1 2 3	NAa	71	[6]C27948
Wainwright:								
Arctic Ocean beach.				M	1 2 3	NAa	72	[6]C27950
Kuk River outcrop.				M	1 2 3	NAa	72	[6]C27949
Do				M	1 2 3	NAa		[6]C27947
Do		Subb		M	1 2			[6]96823
Do		Subb		M	1 2			[6]96822
Mine		Subb		M	1 2 3		72	[6]26371
SEWARD PENINSULA REGION								
Candle: Kugruk				M	1 2 3		72	[6]19928
Chicago Creek:								
Chicago Creek				M	1 2 3		72	6944
Do				M	1 2 3			6942
Do				M	1 2 3			6946

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

tipple, and delivered samples

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Fusibility of ash: Softening temperature, °F.	Fusibility of ash: Fluid temperature, °F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A6849	8.4	31.2	54.1	6.3	0.6	----	----	----	----	11,400	2,000	2,110	2,340	----	------	------
		34.0	59.1	6.9	.7	----	----	----	----	12,440						
A6847	15.0	26.0	41.3	17.7	.3	----	----	----	----	8,470	2,750	2,900	2,940	----	------	------
		30.6	48.5	20.9	.3	----	----	----	----	9,970						
A52083	5.1	31.0	44.4	19.5	.5	4.9	59.0	1.0	15.1	10,320	2,360	2,560	2,830	----	------	------
		32.6	46.9	20.5	.5	4.5	62.1	1.0	11.4	10,870						
		41.1	58.9	----	.7	5.7	78.2	1.3	14.1	13,680						
A6848	16.4	29.9	41.9	11.8	.3	----	----	----	----	8,450	2,290	2,340	2,360	----	------	------
		35.7	50.2	14.1	.3	----	----	----	----	10,110						
[6]96820	9.9	31.5	56.1	2.5	.4	----	----	----	----	11,910	2,040	2,110	2,390	----	------	------
		34.9	62.3	2.8	.5	----	----	----	----	13,210						
96821	3.9	38.6	55.5	2.0	.2	----	----	----	----	13,790	1,990	2,040	2,120	----	------	------
		40.2	57.7	2.1	.2	----	----	----	----	14,360						
[6]C27944	14.4	33.5	47.3	4.8	.6	5.5	60.6	1.4	27.1	10,330	2,170	2,290	2,650	----	------	------
		39.1	55.3	5.6	.7	4.6	70.8	1.6	16.7	12,070						
		41.4	58.6	----	.7	4.9	74.9	1.7	17.8	12,780						
[6]C27945	16.3	33.8	47.0	2.9	.6	5.7	61.4	1.5	27.9	10,470	2,100	2,130	2,180	----	------	------
		40.3	56.2	3.5	.7	4.7	73.3	1.8	16.0	12,510						
		41.8	58.2	----	.7	4.9	76.0	1.8	16.6	12,960						
[6]C27946	17.8	31.9	40.5	9.8	.3	5.4	52.0	1.1	31.4	8,780	2,460	2,570	2,850	----	------	------
		38.9	49.1	12.0	.4	4.2	63.2	1.3	18.9	10,680						
		44.1	55.9	----	.4	4.7	71.9	1.5	21.5	12,140						
[6]C27948	20.2	32.6	41.0	6.2	.5	5.8	53.8	1.2	32.5	9,140	2,470	2,570	2,840	----	------	------
		40.9	51.4	7.7	.7	5.4	67.5	1.4	17.3	11,460						
		44.3	55.7	----	.7	5.9	73.2	1.6	18.6	12,410						
[6]C27950	18.8	32.5	44.9	3.8	.5	5.9	58.1	1.1	30.6	10,000	1,930	2,000	2,090	----	------	------
		40.0	55.3	4.7	.6	4.7	71.6	1.4	17.0	12,320						
		42.0	58.0	----	.6	5.0	75.1	1.5	17.8	12,920						
[6]C27949	18.9	34.1	43.4	3.6	.4	5.8	58.1	1.1	31.0	9,850	2,230	2,590	2,670	----	------	------
		42.0	53.6	4.4	.5	4.5	71.6	1.4	17.6	12,140						
		44.0	56.0	----	.5	4.7	74.9	1.5	18.4	12,700						
[6]C27947	19.3	32.0	45.7	3.0	.3	5.7	57.0	1.2	32.8	9,570	2,150	2,190	2,290	----	------	------
		39.6	56.7	3.7	.4	4.5	70.6	1.5	19.3	11,850						
		41.1	58.9	----	.4	4.6	73.3	1.6	20.1	12,310						
[6]96823	22.3	30.6	44.5	2.6	.3	----	----	----	----	9,900	2,120	2,250	2,360	59.4	13,230	10,190
		39.4	57.3	3.3	.4	----	----	----	----	12,730						
[6]96822	21.8	29.3	43.7	5.2	.4	----	----	----	----	9,460	2,090	2,410	2,450	60.3	13,050	10,030
		37.5	55.8	6.7	.5	----	----	----	----	12,100						
[6]26371	20.7	31.8	44.3	3.2	.3	6.0	57.2	1.1	32.2	9,760	------	------	------	58.4	12,880	10,110
		40.0	56.0	4.0	.4	4.7	72.1	1.4	17.4	12,300						
		41.7	58.3	----	.5	4.9	75.1	1.5	18.0	12,810						
[6]19928	19.7	36.3	38.8	5.2	1.2	6.3	54.8	1.0	31.5	9,580	2,350	2,410	2,440	----	------	------
		45.2	48.4	6.4	1.5	5.1	68.3	1.3	17.4	11,940						
		48.3	51.7	----	1.6	5.4	73.0	1.4	18.6	12,760						
6944	37.8	26.1	32.2	3.9	.7	6.1	41.8	.6	45.9	------	------	------	------	----	------	------
		42.0	51.8	6.2	1.1	4.7	67.2	1.1	19.7	------						
		44.8	55.2	----	1.1	5.0	71.7	1.2	21.0	------						
6942	42.5	24.7	29.5	3.3	.5	7.4	38.6	.6	49.6	------	------	------	------	----	------	------
		42.9	51.3	5.8	.8	4.6	67.1	1.1	20.6	------						
		45.5	54.5	----	.9	4.8	71.3	1.2	21.8	------						
6946	39.7	25.4	31.0	3.9	.7	7.3	39.9	.6	47.6	------	------	------	------	----	------	------
		42.0	51.5	6.5	1.1	4.7	66.2	1.0	20.5	------						
		45.0	55.0	----	1.2	5.1	70.8	1.1	21.8	------						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
SEWARD PENINSULA REGION—con.								
Chicago Creek—Con. Chicago Creek				M	1 2 3		72	6941
Do				M	1 2 3			6943
Do				M	1 2 3			6940
Do				M	1 2 3			6947
Do				M	1 2 3			6948
Do				M	1 2 3			6945
YUKON REGION								
Broad Pass field								
Broad Pass: Prospect		Lig		M	1 2 3	NAa	73	[6]C31318
Do		Lig		M	1 2 3	NAa		[6]C31319
Do		Lig		M	1 2 3	NAa		[6]C31320
Do		Lig		M	1 2 3	NAa		[6]C31321
Do		Lig		M	1 2 3	NAa		[6]C31322
Charley Creek: Prospect.	No. 2			M	1 2		73	5794
Chicken: Prospect		Subc		M	1 2		73	[6]A47661
Do				M	1 2			[6]A47662
Colorado Station: Costello Creek	Dunkle	Subb		M	1 2 3	NAa	73	[6]C1804
Do	do	Suba		M	1 2 3	NAa		[6]C1806
Do	Stevens	Subb		M	1 2 3	NAa		[6]C1805
Do	Billie	Subb		M	1 2 3	NAa		[6]C1807

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Fusibility of ash: Softening temperature, °F.	Fusibility of ash: Fluid temperature, °F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6941	38.5	25.3	32.2	4.0	0.7	7.0	40.5	0.7	47.1	------	------	------	------	----	------	------
		41.1	52.4	6.5	1.2	4.4	65.8	1.1	21.0	------						
		44.0	56.0	----	1.3	4.7	70.4	1.2	22.4	------						
6943	40.1	23.8	30.5	5.6	.6	7.0	40.6	.6	45.6	------	------	------	------	----	------	------
		39.8	50.9	9.3	.9	4.3	67.9	1.1	16.5	------						
		43.8	56.2	----	1.0	4.7	74.8	1.2	18.3	------						
6940	38.3	24.4	30.2	7.1	.9	6.8	37.9	.6	46.7	------	------	------	------	----	------	------
		39.6	49.0	11.4	1.5	4.1	61.4	1.1	20.5	------						
		44.7	55.3	----	1.7	4.6	69.3	1.2	23.2	------						
6947	32.3	21.6	24.6	21.5	.9	5.8	31.1	.5	40.2	------	------	------	------	----	------	------
		31.9	36.4	31.7	1.3	3.3	46.0	.7	17.0	------						
		46.7	53.3	----	1.9	4.9	67.3	1.0	24.9	------						
6948	34.4	23.9	27.8	13.9	1.4	6.4	35.5	.6	42.2	------	------	------	------	----	------	------
		36.5	42.4	21.1	2.1	4.0	54.1	.9	17.8	------						
		46.2	53.8	----	2.7	5.0	68.6	1.2	22.5	------						
6945	35.9	22.0	25.3	16.8	1.0	6.3	32.5	.6	42.8	------	------	------	------	----	------	------
		34.4	39.5	26.1	1.5	3.6	50.7	.9	17.2	------						
		46.5	53.5	----	2.0	4.8	68.7	1.2	23.3	------						
[6]C31318	29.5	28.8	20.7	21.0	.2	6.1	33.7	.5	38.5	5,790	------	------	------	43.4	12,110	7,490
		40.9	29.4	29.7	.3	4.0	47.7	.7	17.6	8,200						
		58.2	41.8	----	.4	5.8	67.9	1.0	24.9	11,670						
[6]C31319	35.8	29.7	23.9	10.6	.2	6.6	35.6	.6	46.4	5,880	------	------	------	45.4	11,150	6,640
		46.3	37.1	16.6	.3	4.1	55.4	.9	22.7	9,160						
		55.5	44.5	----	.4	4.9	66.4	1.0	27.3	10,980						
[6]C31320	35.4	27.8	23.9	12.9	.3	6.5	34.6	.5	45.2	5,720	------	------	------	47.3	11,300	6,640
		43.0	37.0	20.0	.4	3.9	53.5	.8	21.4	8,850						
		53.7	46.3	----	.5	4.9	66.8	1.0	26.8	11,060						
[6]C31321	33.9	28.9	21.1	16.1	.2	6.3	33.0	.5	43.9	5,410	------	------	------	----	------	------
		43.8	31.8	24.4	.3	3.8	49.9	.8	20.8	8,180						
		57.9	42.1	----	.4	5.0	66.0	1.0	27.6	10,820						
[6]C31322	21.8	34.5	28.3	15.4	.2	5.6	41.8	.6	36.4	7,040	------	------	------	----	------	------
		44.1	36.2	19.7	.2	4.1	53.5	.7	21.8	9,000						
		54.9	45.1	----	.3	5.1	66.6	.9	27.1	11,200						
5794	2.1	20.8	54.0	23.1	.6	----	----	----	----	11,230	------	------	------	----	------	------
		21.3	55.1	23.6	.6	----	----	----	----	11,470						
[6]A47661	23.1	30.8	35.7	10.4	.4	----	----	----	----	8,330	------	------	------	54.4	12,700	9,380
		40.0	46.5	13.5	.6	----	----	----	----	10,830						
[6]A47662	12.6	35.4	47.8	4.2	.5	----	----	----	----	10,350	------	------	------	----	------	------
		40.6	54.6	4.8	.6	----	----	----	----	11,850						
[6]C1804	18.4	32.0	40.4	9.2	.6	6.1	55.1	.8	28.2	9,700	2,470	2,530	2,800	56.5	13,560	10,780
		39.2	49.5	11.3	.8	5.0	67.5	1.0	14.4	11,880						
		44.2	55.8	----	.8	5.7	76.0	1.1	16.4	13,380						
[6]C1806	15.9	35.9	42.2	6.0	.5	6.2	59.7	.9	26.7	10,600	2,380	2,440	2,510	54.4	13,670	11,340
		42.7	50.1	7.2	.6	5.3	71.0	1.1	14.8	12,610						
		46.0	54.0	----	.6	5.7	76.5	1.2	16.0	13,580						
[6]C1805	18.8	33.6	41.4	6.2	.5	6.3	57.1	.9	29.0	10,040	2,020	2,090	2,480	55.6	13,490	10,770
		41.4	51.0	7.6	.6	5.2	70.3	1.1	15.2	12,360						
		44.8	55.2	----	.6	5.6	76.1	1.1	16.6	13,380						
[6]C1807	18.2	34.3	39.9	7.6	.5	6.3	56.8	.9	27.9	9,970	2,480	2,520	2,800	54.3	13,570	10,870
		41.9	48.8	9.3	.6	5.3	69.4	1.1	14.3	12,200						
		46.2	53.8	----	.6	5.8	76.5	1.2	15.9	13,450						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2 3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
YUKON REGION—con.								
Broad Pass field—Continued								
Colorado Station—Continued.								
Costello Creek			Run-of-mine	D	1 2		108	1
Do		Subb	do	D **6**	1 2			2
Do		Subb	do	D	1 2			3
Do		Subb	do	D **5**	1 2			4
Dunkle-Camp Creek.	No. 8	Subb		M	1 2 3		74	[6]B67785
Eagle: Prospect	No. 3	Lig		M	1 2		74	5795
Galena: Outcrop				M	1 2	NAa	75	[6]C36293
Iditarod: Prospect		An		M	1 2		75	19347
Innoko district:								
Prospect		An		M	1 2 3		75	26370
Do				M	1 2			A16716
Kaltag:								
Adolph Muller prospect.				M	1 2 3		75	A15869
Prospect				M	1 2		75	C36295
Mount McKinley National Park: Alaska Road Commission.		Subb		M	1 2 3		75	[6]B16186
Mount McKinley National Park district: Prospect.				M	1 2 3		75	[6]87352
Mount McKinley Park Station: Prospect.		Hvab		M	1 2		75	94109
Yanert:								
Yanert				M	1 2		75	94166
Do		Mvb		M	1 2			94167
Do		Mvb		M	1 2			94168
Do			Composite of 94166 to 94168.	M	1 2 3			94169

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis [1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	17.7	37.1	37.4	7.8	0.4	----	----	----	----	9,840	-------	-------	-------	----	------	------
		45.1	45.4	9.5	.5	----	----	----	----	11,950						
2	15.8	38.7	38.2	7.3	.5	----	----	----	----	10,090	-------	-------	-------	----	------	------
		46.0	45.3	8.7	.6	----	----	----	----	11,980						
3	16.6	35.9	38.6	8.9	.5	----	----	----	----	9,960	-------	-------	-------	----	------	------
		43.0	46.3	10.7	.6	----	----	----	----	11,940						
4	14.3	35.5	36.9	13.3	.5	----	----	----	----	9,470	-------	-------	-------	----	------	------
		41.4	43.1	15.5	.6	----	----	----	----	11,050						
[6]B67785	16.3	34.6	42.0	7.1	.6	5.9	58.1	0.9	27.4	10,010	2,180	2,220	2,440	55.4	13,180	10,850
		41.3	50.2	8.5	.7	4.9	69.3	1.1	15.5	11,960						
		45.1	54.9	----	.7	5.3	75.8	1.2	17.0	13,070						
5795	19.8	33.1	22.7	24.4	.2	----	----	----	----	6,270	-------	-------	-------	----	------	------
		41.3	28.3	30.4	.2	----	----	----	----	7,810						
[6]C36293	8.5	37.0	51.9	2.6	.4	----	----	----	----	10,170	2,290	2,370	2,640	----	------	------
		40.5	56.7	2.8	.4	----	----	----	----	11,110						
19347	1.4	6.6	84.7	7.3	1.1	----	----	----	----	------	2,080	2,380	2,570	----	------	------
		6.7	85.9	7.4	1.1	----	----	----	----	------						
26370	1.5	7.7	85.6	5.2	.8	3.4	85.9	1.6	3.1	14,300	-------	-------	-------	----	------	------
		7.8	86.9	5.3	.8	3.3	87.2	1.6	1.8	14,520						
		8.2	91.8	----	.8	3.4	92.0	1.7	2.1	15,320						
A16716	5.0	30.0	50.5	14.5	.3	----	----	----	----	10,470	-------	-------	-------	----	------	------
		31.6	53.1	15.3	.3	----	----	----	----	11,020						
A15869	7.0	24.3	47.2	21.5	.5	4.1	55.6	1.2	17.1	9,470	2,910+	-------	-------	----	------	------
		26.1	50.8	23.1	.5	3.6	59.8	1.3	11.7	10,180						
		34.0	66.0	----	.7	4.7	77.9	1.7	15.0	13,250						
C36295	4.0	33.8	53.1	9.1	.3	----	----	----	----	12,010	2,680	2,740	2,910	----	------	------
		35.2	55.3	9.5	.4	----	----	----	----	12,500						
[6]B16186	21.8	36.9	35.6	5.7	.5	6.4	51.9	1.2	34.3	9,050	2,060	2,230	2,520	49.5	12,580	9,650
		47.1	45.6	7.3	.6	5.1	66.4	1.5	19.1	11,580						
		50.9	49.1	----	.6	5.5	71.7	1.6	20.6	12,500						
[6]87352	21.2	36.6	33.2	9.0	.3	6.1	50.0	.6	34.0	8,530	-------	-------	-------	----	------	------
		46.4	42.2	11.4	.4	4.7	63.4	.8	19.3	10,830						
		52.4	47.6	----	.4	5.3	71.6	.9	21.8	12,220						
94109	2.6	35.7	52.4	9.3	.3	----	----	----	----	13,250	2,150	2,240	2,340	60.0	15,180	14,740
		36.7	53.7	9.6	.3	----	----	----	----	13,600						
94166	7.7	11.4	64.7	16.2	.7	----	----	----	----	11,050	2,110	2,390	2,450	----	------	------
		12.3	70.2	17.5	.8	----	----	----	----	11,970						
94167	4.2	24.2	59.7	11.9	.4	----	----	----	----	12,180	2,280	2,510	-------	72.0	14,700	13,990
		25.3	62.3	12.4	.4	----	----	----	----	12,710						
94168	5.9	18.6	56.8	18.7	.4	----	----	----	----	10,590	2,190	2,390	2,510	77.0	14,350	13,280
		19.7	60.4	19.9	.4	----	----	----	----	11,260						
94169	5.0	21.0	58.8	15.2	.4	4.2	67.4	1.0	11.8	11,350	-------	-------	-------	74.9	14,460	13,590
		22.1	61.9	16.0	.4	3.9	71.0	1.1	7.6	11,950						
		26.4	73.6	----	.5	4.6	84.4	1.3	9.2	14,220						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2,3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
YUKON REGION—con.								
Nenana field								
California Creek: Outcrop		Lig		M	1 2 3		76	[6]26359
Do		Lig		M	1 2 3			[6]26360
Do		Lig		M	1 2 3			[6]26361
Healy Creek: Outcrop				M	1 2 3		76	[6]26368
Do		Lig		M	1 2 3			[6]17794
Do		Lig		M	1 2 3			[6]17795
Do		Lig		M	1 2 3			[6]17796
Healy Fork: Outcrop	No. 6 (?)			M	1 2 3	NAa	76	[6]C30893
Do	do			M	1 2 3	NAa		[6]C30894
Do	No. 3 (?)			M	1 2 3	NAa		[6]C30892
Do	do			M	1 2 3	NAa		[6]C30895
Roth Property outcrop.		Subc		M	1 2		77	X10030
Do		Subb		M	1 2			X10031
Do	Morse	Subb		M	1 2			X10032
Do	do	Subb		M	1 2			X10035
Do		Subc		M	1 2			X10033
Do	Mammoth	Subb		M	1 2			X10034
Do		Subc		M	1 2			X10036
Roth-Taylor	Mammoth			M	1 2 3		77	[6]A11088
Lignite Creek: Alaskan Engineering Commission.		Lig		M	1 2			[6]30846
Do		Lig		M	1 2			[6]30847

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
aced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Fusibility of ash: Softening temperature, °F.	Fusibility of ash: Fluid temperature, °F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
[6]26359	38.2	23.8	22.2	15.8	0.4	6.5	31.1	0.5	45.7	5,260	------	------	------	49.6	11,770	6,830
		38.6	35.8	25.6	.6	3.6	50.4	.8	19.0	8,520						
		51.8	48.2	----	.8	4.8	67.7	1.1	25.6	11,440						
[6]26360	25.7	32.3	22.7	19.3	.2	5.9	37.9	.5	36.2	6,480	------	------	------	----	------	------
		43.4	30.7	25.9	.3	4.1	50.9	.7	18.1	8,710						
		58.6	41.4	----	.4	5.6	68.7	1.0	24.3	11,760						
[6]26361	26.5	25.1	16.4	32.0	.2	5.4	27.4	.5	34.5	4,710	------	------	------	----	------	------
		34.2	22.3	43.5	.3	3.3	37.3	.7	14.9	6,400						
		60.5	39.5	----	.5	5.8	66.0	1.2	26.5	11,340						
[6]26368	21.5	41.8	30.8	5.9	.3	6.1	49.2	.7	37.8	8,580	------	------	------	----	------	------
		53.3	39.2	7.5	.3	4.7	62.6	.9	24.0	10,930						
		57.6	42.4	----	.4	5.0	67.7	.9	26.0	11,820						
[6]17794	25.7	36.4	34.5	3.4	.2	6.9	51.4	.7	37.4	8,740	------	------	------	----	------	------
		49.0	46.5	4.5	.2	5.4	69.2	1.0	19.7	11,760						
		51.3	48.7	----	.2	5.7	72.5	1.0	20.6	12,320						
[6]17795	28.5	34.3	33.6	3.6	.1	6.7	48.1	.7	40.8	8,090	2,250	2,570	2,640	----	------	------
		48.0	47.0	5.0	.1	4.9	67.2	1.0	21.8	11,320						
		50.5	49.5	----	.1	5.2	70.8	1.0	22.9	11,920						
[6]17796	27.4	34.7	33.5	4.4	.2	6.7	48.5	.7	39.5	8,290	------	------	------	----	------	------
		47.3	46.1	6.1	.2	5.0	66.8	.9	21.0	11,420						
		50.9	49.1	----	.2	5.4	71.2	1.0	22.2	12,160						
[6]C30893	23.9	39.6	28.0	8.5	.2	6.5	47.3	.6	36.9	8,230	2,140	2,190	2,340	----	------	------
		52.1	36.7	11.2	.3	5.1	62.2	.8	20.4	10,810						
		58.7	41.3	----	.3	5.7	70.1	1.0	22.9	12,180						
[6]C30894	25.9	31.2	24.9	18.0	.2	5.9	38.3	.6	37.0	6,540	2,240	2,330	2,620	----	------	------
		42.1	33.6	24.3	.3	4.1	51.7	.8	18.8	8,820						
		55.6	44.4	----	.4	5.4	68.3	1.0	24.9	11,650						
[6]C30892	24.6	37.9	32.8	4.7	.1	6.5	49.8	.7	38.2	8,630	2,420	2,470	2,510	----	------	------
		50.2	43.6	6.2	.2	5.0	66.1	.9	21.6	11,450						
		53.6	46.4	----	.2	5.4	70.5	1.0	22.9	12,200						
[6]C30895	25.6	36.3	34.0	4.1	.1	6.4	49.1	.7	39.6	8,330	2,520	2,560	2,610	----	------	------
		48.8	45.7	5.5	.1	4.7	66.0	.9	22.8	11,190						
		51.6	48.4	----	.2	5.0	69.9	1.0	23.9	11,840						
X10030	23.8	39.5	31.3	5.4	.2	----	----	----	----	8,410	------	------	------	44.5	11,960	8,930
		51.8	41.1	7.1	.3	----	----	----	----	11,040						
X10031	21.6	39.8	31.5	7.1	.2	----	----	----	----	8,870	------	------	------	44.6	12,540	9,600
		50.8	40.2	9.0	.3	----	----	----	----	11,310						
X10032	19.0	42.4	35.3	3.3	.2	----	----	----	----	10,260	------	------	------	45.6	13,250	10,640
		52.3	43.6	4.1	.2	----	----	----	----	12,670						
X10035	19.8	42.1	34.5	3.6	.2	----	----	----	----	9,970	------	------	------	45.3	13,060	10,370
		52.5	43.0	4.5	.2	----	----	----	----	12,430						
X10033	24.2	37.9	33.4	4.5	.2	----	----	----	----	8,390	------	------	------	47.2	11,820	8,810
		50.0	44.1	5.9	.3	----	----	----	----	11,060						
X10034	22.0	39.6	29.0	9.4	.2	----	----	----	----	8,670	------	------	------	42.8	12,780	9,640
		50.7	37.2	12.1	.3	----	----	----	----	11,110						
X10036	24.3	38.5	33.2	4.0	.2	----	----	----	----	8,750	------	------	------	46.6	12,260	9,140
		50.8	43.9	5.3	.3	----	----	----	----	11,550						
[6]A11088	16.2	41.5	38.5	3.8	.1	6.5	59.0	1.1	29.5	10,500	2,370	2,410	2,430	----	------	------
		49.6	45.8	4.6	.1	5.5	70.5	1.3	18.0	12,530						
		51.9	48.1	----	.1	5.8	73.8	1.4	18.9	13,130						
[6]30846	20.8	39.0	30.1	10.1	.2	----	----	----	----	8,160	2,130	2,180	2,360	----	------	------
		49.2	38.0	12.8	.2	----	----	----	----	10,310						
[6]30847	32.3	34.2	19.5	14.0	.4	----	----	----	----	6,130	2,130	2,190	2,300	----	------	------
		50.5	28.8	20.7	.5	----	----	----	----	9,050						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
YUKON REGION—con.								
Nenana field—Con.								
Lignite Creek—Con. Alaskan Engineering Commission.		Lig		M	1 2	-----	-----	[6]30848
Do		Lig		M	1 2	-----		[6]30849
Do		Lig		M	1 2	-----		[6]30850
Do		Lig		M	1 2	-----		[6]30851
Calderhead		Lig		M	1 2 3	-----	77	[6]34587
Outcrop	"B"	Lig		M	1 2 3	-----	77	[6]26362
Do		Lig		M	1 2 3	-----		[6]26363
Do		Lig		M	1 2 3	-----		[6]26364
Do		Lig		M	1 2 3	-----		[6]26365
Do		Lig		M	1 2 3	-----		[6]26366
Do		Lig		M	1 2 3	-----		[6]26367
Do		Lig		M	1 2 3	-----		[6]26369
Do	No. 5	Lig		M	1 2 3	-----		[6]26588
Do	No. 1	Lig		M	1 2 3	-----		[6]26589
Nenana River: Outcrop.		Lig		M	1 2	-----	78	[6]23042
Nulato: Prospect		-----		M	1 2	NAa	78	C36294
Suntrana: New Suntrana (Hill).	"E"	Subb		M	1 2 3	NAa	78	[6]C9524
Do	"C"	Subb		M	1 2 3	NAa		[6]C9525
Do	"B"	Subb		M	1 2 3	NAa		[6]C9526
Do	"F"	Subb		M	1 2 3	NAa		[6]C9527
Do	"D"	Subb		M	1 2 3	NAa		[6]C9530

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.[4]	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis[1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
[6]30848	36.7	32.4	21.0	9.9	0.3	----	----	----	----	5,880	2,130	2,190	2,220	----	------	------
		51.2	33.2	15.6	.5	----	----	----	----	9,290						
[6]30849	30.2	34.2	20.5	15.1	.3	----	----	----	----	6,080	2,190	2,240	2,300	----	------	------
		49.0	29.3	21.7	.5	----	----	----	----	8,710						
[6]30850	33.6	35.4	21.9	9.1	.4	----	----	----	----	6,180	2,130	2,150	2,170	----	------	------
		53.2	33.1	13.7	.6	----	----	----	----	9,310						
[6]30851	38.5	31.0	20.8	9.7	.4	----	----	----	----	5,720	2,140	2,200	2,300	----	------	------
		50.5	33.8	15.7	.7	----	----	----	----	9,310						
[6]34587	26.5	35.8	28.2	9.5	.2	6.4	44.0	0.6	39.3	7,570	------	------	------	----	------	------
		48.7	38.4	12.9	.3	4.7	59.8	.8	21.5	10,300						
		55.9	44.1	----	.3	5.4	68.6	.9	24.8	11,820						
[6]26362	20.6	38.8	30.0	10.6	.2	5.9	47.5	.7	35.1	8,060	------	------	------	----	------	------
		48.9	37.8	13.3	.2	4.5	59.8	.8	21.4	10,160						
		56.4	43.6	----	.3	5.2	69.0	1.0	24.5	11,720						
[6]26363	28.7	35.9	30.3	5.1	.2	6.7	45.8	.6	41.6	7,760	------	------	------	----	------	------
		50.4	42.4	7.2	.2	4.9	64.3	.8	22.6	10,890						
		54.3	45.7	----	.2	5.3	69.2	.9	24.4	11,730						
[6]26364	22.2	35.4	29.6	12.8	.2	5.9	45.1	.6	35.4	7,690	------	------	------	----	------	------
		45.5	38.1	16.4	.3	4.4	58.0	.8	20.1	9,880						
		54.4	45.6	----	.3	5.3	69.4	.9	24.1	11,820						
[6]26365	23.2	37.6	35.0	4.2	.1	6.3	51.5	.6	37.3	8,880	------	------	------	----	------	------
		49.0	45.5	5.5	.2	4.8	67.1	.7	21.7	11,570						
		51.8	48.2	----	.2	5.1	71.1	.8	22.8	12,250						
[6]26366	24.3	38.0	29.3	8.4	.2	6.3	46.8	.6	37.7	8,020	------	------	------	----	------	------
		50.2	38.7	11.1	.3	4.8	61.9	.8	21.1	10,600						
		56.4	43.6	----	.3	5.4	69.6	.9	23.8	11,920						
[6]26367	25.3	36.1	32.6	6.0	.3	6.4	47.6	.6	39.1	8,140	------	------	------	----	------	------
		48.3	43.7	8.0	.4	4.8	63.7	.8	22.3	10,890						
		52.5	47.5	----	.4	5.2	69.2	.9	24.3	11,840						
[6]26369	23.8	35.6	28.8	11.8	.4	5.6	42.7	.7	38.8	7,010	------	------	------	----	------	------
		46.7	37.9	15.4	.5	3.9	56.0	.9	23.3	9,200						
		55.2	44.8	----	.6	4.6	66.2	1.0	27.6	10,880						
[6]26588	32.5	33.6	27.2	6.7	.1	6.3	39.9	.6	46.4	6,640	1,980	2,140	2,200	----	------	------
		49.8	40.3	9.9	.2	4.0	59.1	.9	25.9	9,830						
		55.3	44.7	----	.2	4.4	65.6	1.0	28.8	10,920						
[6]26589	27.9	35.8	29.3	7.0	.1	6.5	45.0	.5	40.9	7,990	------	------	------	----	------	------
		49.7	40.5	9.8	.2	4.7	62.4	.7	22.2	11,080						
		55.1	44.9	----	.2	5.2	69.2	.8	24.6	12,280						
[6]23042	28.2	34.5	33.7	3.6	.2	----	----	----	----	8,080	2,200	2,370	2,600	----	------	------
		48.1	46.8	5.1	.2	----	----	----	----	11,240						
C36294	2.8	22.5	69.8	4.9	.9	----	----	----	----	13,350	2,230	2,360	2,760	----	------	------
		23.1	71.9	5.0	.9	----	----	----	----	13,730						
[6]C9524	21.9	35.8	31.5	10.8	.4	6.4	49.7	.8	31.9	8,710	2,250	2,300	2,500	47.4	13,120	9,860
		45.8	40.4	13.8	.5	5.0	63.6	1.0	16.1	11,160						
		53.2	46.8	----	.6	5.9	73.8	1.2	18.5	12,950						
[6]C9525	20.0	36.9	30.4	12.7	.2	6.3	49.6	.7	30.5	8,760	2,380	2,430	2,580	45.9	13,220	10,150
		46.2	38.0	15.8	.3	5.1	62.0	.9	15.9	10,950						
		54.8	45.2	----	.3	6.0	73.7	1.1	18.9	13,010						
[6]C9526	23.1	37.0	34.7	5.2	.2	6.7	53.6	.8	33.5	9,440	2,130	2,180	2,230	48.8	13,250	10,000
		48.1	45.1	6.8	.3	5.4	69.8	1.1	16.6	12,280						
		51.6	48.4	----	.3	5.8	74.9	1.2	17.8	13,180						
[6]C9527	21.7	36.4	32.5	9.4	.2	6.4	50.2	.8	33.0	8,830	2,280	2,350	2,530	47.8	12,930	9,830
		46.5	41.5	12.0	.3	5.1	64.1	1.1	17.4	11,280						
		52.9	47.1	----	.3	5.8	72.9	1.2	19.8	12,830						
[6]C9530	21.1	34.9	31.0	13.0	.3	6.2	48.6	.8	31.1	8,530	2,360	2,400	2,710	47.9	13,160	9,920
		44.2	39.3	16.5	.4	4.9	61.6	1.0	15.6	10,800						
		52.9	47.1	----	.5	5.9	73.8	1.2	18.6	12,940						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
YUKON REGION—con.								
Nenana field—Con.								
Suntrana—Con.								
Old Suntrana	No. 4	Subc		M	1 2 3	NAa	78	[6]C9528
Do	No. 6	Subb		M	1 2 3	NAa		[6]C9529
Prospect		Subc		M	1 2 3	NAa	80	[6]C31323
Do		Subc		M	1 2 3	NAa		[6]C31324
Do				M	1 2 3	NAa		[6]C31325
Do				M	1 2 3	NAa		[6]C31326
Do				M	1 2 3	NAa		[6]C31327
Suntrana	Donaldson (No. 3)	Subc		M	1 2 3	NAa	81	[6]B80608
Do	do	Subc		M	1 2 3	NAa		[6]B80609
Do	do	Subc		M	1 2 3	NAa		[6]B80610
Do	do	Subc	Run-of-mine	D	1 2	-----	108	5
Do	do	Subc	do	D **8**	1 2	-----		6
Do	do	Subc	do	D **3**	1 2	-----		7
Do	do	Subc	do	D **5**	1 2	-----		8
Do	do	Subc	Nut	D **62**	1 2	-----		9
Do	do	Subc	do	D **11**	1 2	-----		10
Do	do	Subc	do	D **14**	1 2	-----		11
Do	do	Subc	do	D **13**	1 2	-----		12
Do	do	Subc	do	D **12**	1 2	-----		13
Do	do	Subc	do	D **12**	1 2	-----		14
Do	do	Subc	do	D **7**	1 2	-----		15
Do	do	Subc	do	D **2**	1 2	-----		16
Do	do	Subc	Nut and chestnut	D **3**	1 2	-----		17
Do	do	Subc	do	D **4**	1 2	-----		18
Do	do	Subc	do	D **3**	1 2	-----		19
Do	do	Subc	do	D **4**	1 2	-----		20

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis [1]	Calorific value	
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Fixed carbon, dry basis, percent	B. t. u., dry basis	B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
[6]C9528	26.0	34.8	30.6	8.6	0.2	6.4	46.3	0.7	37.8	7,920	2,130	2,160	2,370	47.4	12,240	8,730
		47.0	41.4	11.6	.2	4.7	62.6	.9	20.0	10,710						
		53.2	46.8	----	.3	5.4	70.8	1.0	22.5	12,110						
[6]C9529	18.6	43.7	30.2	7.5	.1	6.5	52.6	.7	32.6	9,290	2,180	2,270	2,400	41.2	12,680	10,110
		53.6	37.2	9.2	.1	5.5	64.7	.8	19.7	11,410						
		59.1	40.9	----	.1	6.0	71.2	.9	21.8	12,570						
[6]C31323	25.8	35.4	34.2	4.6	.1	6.5	48.8	.7	39.3	8,320	------	------	------	49.5	12,030	8,760
		47.7	46.1	6.2	.2	4.8	65.8	.9	22.1	11,220						
		50.9	49.1	----	.2	5.1	70.1	1.0	23.6	11,970						
[6]C31324	22.5	38.8	34.3	4.4	.2	6.4	51.1	.7	37.2	8,790	------	------	------	47.2	12,090	9,230
		50.0	44.4	5.6	.3	5.1	66.0	.9	22.1	11,340						
		53.0	47.0	----	.3	5.4	69.9	.9	23.5	12,020						
[6]C31325	24.4	37.2	32.6	5.8	.2	6.5	48.9	.7	37.9	8,340	------	------	------	----	------	------
		49.2	43.2	7.6	.3	5.0	64.6	1.0	21.5	11,030						
		53.3	46.7	----	.3	5.4	70.0	1.0	23.3	11,950						
[6]C31326	29.1	34.7	29.9	6.3	.3	6.5	44.6	.7	41.6	7,540	------	------	------	----	------	------
		48.9	42.2	8.9	.4	4.7	62.9	1.0	22.1	10,630						
		53.6	46.4	----	.5	5.1	69.0	1.1	24.3	11,670						
[6]C31327	29.3	35.8	27.8	7.1	.1	6.6	43.3	.5	42.4	7,290						
		50.6	39.3	10.1	.2	4.7	61.2	.7	23.1	10,300						
		56.3	43.7	----	.2	5.2	68.1	.8	25.7	11,460						
[6]B80608	22.3	37.2	34.0	6.5	.1	6.4	50.7	.6	35.7	8,640	2,080	2,140	2,310	48.1	12,230	9,290
		47.9	43.7	8.4	.1	5.1	65.3	.8	20.3	11,130						
		52.3	47.7	----	.2	5.5	71.2	.9	22.2	12,150						
[6]B80609	25.4	36.5	33.8	4.3	.2	6.6	49.7	.6	38.6	8,440	2,360	2,420	2,530	48.4	12,070	8,850
		48.9	45.4	5.7	.3	5.1	66.6	.9	21.4	11,330						
		51.9	48.1	----	.3	5.4	70.7	.9	22.7	12,020						
[6]B80610	25.1	36.2	35.2	3.5	.1	6.6	50.7	.6	38.5	8,580	2,570	2,610	2,690	49.5	12,070	8,920
		48.4	46.9	4.7	.1	5.1	67.8	.8	21.5	11,460						
		50.8	49.2	----	.1	5.4	71.1	.8	22.6	12,020						
5	22.5	38.1	28.2	11.2	.2	----	----	----	----	8,190	------	------	------	----	------	------
		49.2	36.4	14.4	.2	----	----	----	----	10,560						
6	22.5	37.7	30.1	9.7	.2	----	----	----	----	8,240	------	------	------	----	------	------
		48.7	38.8	12.5	.3	----	----	----	----	10,630						
7	22.1	40.0	29.0	8.9	.2	----	----	----	----	8,410	------	------	------	----	------	------
		51.4	37.2	11.4	.3	----	----	----	----	10,800						
8	19.2	40.2	30.2	10.4	.2	----	----	----	----	8,680						
		49.7	37.4	12.9	.3	----	----	----	----	10,740						
9	19.3	44.9	29.2	6.6	.1	----	----	----	----	9,440	------	------	------	----	------	------
		55.6	36.2	8.2	.1	----	----	----	----	11,700						
10	20.4	45.6	27.6	6.4	.1	----	----	----	----	8,940	------	------	------	----	------	------
		57.3	34.6	8.1	.1	----	----	----	----	11,230						
11	19.7	44.4	28.7	7.2	.1	----	----	----	----	8,890	------	------	------	----	------	------
		55.3	35.7	9.0	.1	----	----	----	----	11,070						
12	21.1	42.4	29.0	7.5	.1	----	----	----	----	8,730	------	------	------	----	------	------
		53.7	36.8	9.5	.1	----	----	----	----	11,060						
13	20.6	42.7	29.5	7.1	.2	----	----	----	----	8,840	------	------	------	----	------	------
		53.8	37.2	9.0	.3	----	----	----	----	11,130						
14	21.4	41.3	28.6	8.7	.2	----	----	----	----	8,620	------	------	------	----	------	------
		52.6	36.3	11.1	.3	----	----	----	----	10,970						
15	22.4	38.1	30.2	9.3	.2	----	----	----	----	8,310	------	------	------	----	------	------
		49.1	38.9	12.0	.3	----	----	----	----	10,710						
16	20.4	43.5	29.9	6.2	.2	----	----	----	----	9,170	------	------	------	----	------	------
		54.7	37.5	7.8	.3	----	----	----	----	11,520						
17	20.7	44.0	28.5	6.8	.2	----	----	----	----	8,920	------	------	------	----	------	------
		55.5	35.9	8.6	.2	----	----	----	----	11,250						
18	18.2	44.4	30.5	6.9	.2	----	----	----	----	9,170	------	------	------	----	------	------
		54.3	37.3	8.4	.3	----	----	----	----	11,210						
19	20.6	41.0	30.1	8.3	.2	----	----	----	----	8,620	------	------	------	----	------	------
		51.6	37.9	10.5	.2	----	----	----	----	10,860						
20	22.7	39.3	29.4	8.6	.2	----	----	----	----	8,430	------	------	------	----	------	------
		50.8	38.1	11.1	.3	----	----	----	----	10,900						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
YUKON REGION—con.								
Nenana field—Con.								
Suntrana—Con.								
Suntrana	Donaldson (No. 3)	Subc	Nut and chestnut	D	1 2	-----	108	21
Do	do	Subc	Chestnut	D **8**	1 2	-----		22
Do	do	Subc	do	D **48**	1 2	-----		23
Do	do	Subc	do	D **44**	1 2	-----		24
Do	do	Subc	do	D **10**	1 2	-----		25
Do	do	Subc	do	D **13**	1 2	-----		26
Do	do	Subc	do	D **9**	1 2	-----		27
Do	do	Subc	do	D **9**	1 2	-----		28
Do	do	Subc	do	D **9**	1 2	-----		29
Do	do	Subc	do	D **6**	1 2	-----		30
Tatlanika Creek: Outcrop		Lig		M	1 2 3	-----	81	[6]17797
Unalakleet: Prospect				M	1 2	NAb	82	[6]C36296
Do				M	1 2 3	NAa		[6]B64867
KUSKOKWIM REGION								
Nelson Island: Mine				M	1 2 3	Cf	-----	C29496
Do				M	1 2 3	Cg		C29497
Do				M	1 2 3	Af		C29498
Do				M	1 2 3	Af		C29499
Prospect				M	1 2 3	-----	82	A15868
Sleitmut: Prospect		Peat		M	1 2 3	NAb	82	[6]B91995
Do		do		M	1 2 3	NAb		[6]B91996

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Fusibility of ash: Softening temperature, °F.	Fusibility of ash: Fluid temperature, °F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
21	20.0	43.2	31.2	5.6	0.2	----	----	----	----	8,880	------	------	------	----	------	------
		54.0	39.0	7.0	.3	----	----	----	----	11,100						
22	21.3	44.0	28.0	6.7	.2	----	----	----	----	8,980	------	------	------	----	------	------
		55.9	35.6	8.5	.2	----	----	----	----	11,410						
23	19.1	45.0	28.9	7.0	.2	----	----	----	----	9,250	------	------	------	----	------	------
		55.6	35.7	8.7	.2	----	----	----	----	11,440						
24	19.5	46.0	27.9	6.6	.1	----	----	----	----	9,310	------	------	------	----	------	------
		57.2	34.6	8.2	.1	----	----	----	----	11,570						
25	20.4	45.1	28.0	6.5	.1	----	----	----	----	8,880	------	------	------	----	------	------
		56.6	35.2	8.2	.1	----	----	----	----	11,150						
26	19.0	45.4	28.0	7.6	.1	----	----	----	----	8,950	------	------	------	----	------	------
		56.0	34.6	9.4	.1	----	----	----	----	11,050						
27	20.7	43.1	29.4	6.8	.1	----	----	----	----	8,840	------	------	------	----	------	------
		54.3	37.1	8.6	.1	----	----	----	----	11,150						
28	20.6	42.9	28.7	7.8	.2	----	----	----	----	8,790	------	------	------	----	------	------
		54.0	36.2	9.8	.3	----	----	----	----	11,070						
29	21.3	40.9	29.8	8.0	.2	----	----	----	----	8,780	------	------	------	----	------	------
		52.0	37.8	10.2	.3	----	----	----	----	11,060						
30	21.8	39.8	30.0	8.4	.2	----	----	----	----	8,520	------	------	------	----	------	------
		50.9	38.4	10.7	.3	----	----	----	----	10,890						
[6]17797	19.7	37.6	24.6	18.1	.3	5.7	42.8	0.6	32.5	7,290	------	------	------	----	------	------
		46.6	30.8	22.6	.3	4.4	53.2	.7	18.8	9,070						
		60.2	39.8	----	.4	5.6	68.7	.9	24.4	11,720						
[6]C36296	10.7	45.9	39.2	4.2	.3	----	----	----	----	10,670	2,090	2,160	2,480	----	------	------
		51.4	43.9	4.7	.4	----	----	----	----	11,950						
[6]B64867	18.0	41.8	33.5	6.7	.4	6.4	53.3	.7	32.5	9,430	2,060	2,140	2,180	----	------	------
		51.0	40.8	8.2	.5	5.4	65.0	.9	20.0	11,500						
		55.5	44.5	----	.6	5.9	70.8	1.0	21.7	12,530						
C29496	2.3	19.1	47.1	31.5	.5	3.6	57.0	.9	6.5	9,910	2,330	2,520	2,710	----	------	------
		19.5	48.2	32.3	.6	3.4	58.4	.9	4.4	10,150						
		28.9	71.1	----	.8	5.1	86.2	1.4	6.5	15,000						
C29497	1.6	24.3	52.6	21.5	.5	4.0	65.5	1.2	7.3	11,330	2,150	2,210	2,330	----	------	------
		24.7	53.5	21.8	.5	3.9	66.6	1.2	6.0	11,510						
		31.5	68.5	----	.6	5.0	85.2	1.6	7.6	14,720						
C29498	3.9	23.8	54.1	18.2	.4	4.3	66.1	1.2	9.8	11,440	2,620	2,710	2,910	----	------	------
		24.7	56.3	19.0	.5	4.0	68.8	1.2	6.5	11,900						
		30.5	69.5	----	.6	5.0	84.9	1.5	8.0	14,680						
C29499	3.9	23.7	54.2	18.2	.4	4.3	66.2	1.2	9.7	11,410	2,490	2,570	2,770	----	------	------
		24.7	56.4	18.9	.4	4.0	68.8	1.2	6.7	11,870						
		30.4	69.6	----	.5	4.9	84.8	1.5	8.3	14,640						
A15868	2.3	20.8	62.7	14.2	.5	4.1	73.3	1.1	6.8	12,640	2,240	2,300	2,490	----	------	------
		21.3	64.1	14.6	.5	4.0	75.0	1.2	4.7	12,930						
		25.0	75.0	----	.6	4.6	87.8	1.3	5.7	15,130						
[6]B91995	49.5	31.6	14.9	4.0	.3	8.1	27.2	1.4	59.0	4,640	------	------	------	32.2	10,050	4,840
		62.6	29.6	7.8	.7	5.2	53.9	2.7	29.7	9,180						
		68.0	32.0	----	.7	5.7	58.5	3.0	32.1	9,970						
[6]B91996	38.0	39.0	18.2	4.8	.4	7.5	33.2	1.7	52.4	5,650	------	------	------	32.0	9,950	5,950
		62.9	29.3	7.8	.7	5.2	53.1	2.8	29.9	9,110						
		68.2	31.8	----	.8	5.7	58.6	3.0	32.4	9,880						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2, 3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
SOUTHWESTERN ALASKA REGION								
Chignik Bay:								
Alaska Packers' Association.		Hvcb		M	1 2 3		82	6953
Hook Bay		Hvab		M	1 2 3		82	6952
Thompson Valley prospect.		Hvcb		M	1 2 3		82	6956
Whalers Creek		Hvbb		M	1 2 3		83	6955
Herendeen Bay:								
Johnson tunnel		Hvcb		M	1 2 3		83	6951
Lower tunnel		Hvcb		M	1 2 3		84	6957
Prospect on Mine Creek.				M	1 2		84	X1
Do				M	1 2			X2
Do				M	1 2			X3
Do				M	1 2			X4
Do				M	1 2			X5
Do				M	1 2			X6
Do				M	1 2			X7
Do				M	1 2			X8
Do				M	1 2			X9
Do		Hvcb		M	1 2			X10
Do		Hvcb		M	1 2			X11
Unga Island: Coal Harbor.		Lig		M	1 2 3		85	6954
COOK INLET REGION								
Cook Inlet field								
Bluff Point:								
Bluff Point	Cooper	Subc		M	1 2		85	[6]81606
Do	do	Subc		M	1 2			[6]81607
Do	do	Subc		M	1 2			[6]81608
Do	do	Subc	Composite of 81606 to 81608.	M	1 2 3			[6]81609

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis[1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, °F.	Softening temperature, °F.	Fluid temperature, °F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6953	7.1	31.5	39.6	21.8	1.3	4.8	55.1	0.6	16.4	9,850	------	------	------	57.4	14,260	12,920
		33.9	42.7	23.4	1.4	4.4	59.3	.7	10.8	10,600						
		44.2	55.8	----	1.8	5.7	77.5	.9	14.1	13,840						
6952	5.1	27.2	42.4	25.3	2.3	4.5	55.7	.6	11.6	10,110	------	------	------	63.3	15,070	14,000
		28.7	44.7	26.6	2.4	4.2	58.7	.6	7.5	10,650						
		39.1	60.9	----	3.2	5.7	80.1	.8	10.2	14,530						
6956	10.8	30.3	44.0	14.9	.7	5.0	55.3	.6	23.5	9,640	------	------	------	60.4	13,210	11,500
		34.0	49.3	16.7	.8	4.2	61.9	.7	15.7	10,800						
		40.8	59.2	----	.9	5.1	74.3	.8	18.9	12,960						
6955	5.0	34.3	45.4	15.3	1.8	4.9	62.0	.6	15.4	11,240	------	------	------	58.2	14,390	13,520
		36.1	47.8	16.1	1.8	4.5	65.3	.6	11.7	11,840						
		43.0	57.0	----	2.2	5.4	77.8	.7	13.9	14,100						
6951	8.0	33.5	51.4	7.1	.4	5.4	66.4	.8	19.9	11,790	------	------	------	61.0	13,990	12,780
		36.5	55.8	7.7	.5	4.9	72.2	.9	13.8	12,810						
		39.5	60.5	----	.5	5.3	78.3	.9	15.0	13,880						
6957	7.5	32.1	48.8	11.6	.3	5.1	63.5	.9	18.6	11,260	------	------	------	61.0	14,090	12,880
		34.7	52.7	12.6	.3	4.6	68.6	1.0	12.9	12,170						
		39.7	60.3	----	.4	5.3	78.5	1.1	14.7	13,920						
X1	2.7	29.2	30.4	37.7	.4	----	----	----	----	8,160	------	------	------	----	------	------
		30.0	31.2	38.8	.4	----	----	----	----	8,390						
X2	4.5	38.6	47.6	9.3	.5	----	----	----	----	11,430	------	------	------	----	------	------
		40.4	49.9	9.7	.5	----	----	----	----	11,970						
X3	5.6	36.9	48.5	9.0	.5	----	----	----	----	11,190	------	------	------	----	------	------
		39.1	51.4	9.5	.5	----	----	----	----	11,850						
X4	4.6	37.4	53.0	5.0	.4	----	----	----	----	12,420	------	------	------	----	------	------
		39.2	55.5	5.3	.4	----	----	----	----	13,010						
X5	4.3	38.3	48.5	8.9	.5	----	----	----	----	12,110	------	------	------	----	------	------
		40.0	50.7	9.3	.5	----	----	----	----	12,650						
X6	5.6	35.2	47.2	12.0	.4	----	----	----	----	11,150	------	------	------	----	------	------
		37.3	50.0	12.7	.4	----	----	----	----	11,810						
X7	4.2	37.1	47.8	10.9	.4	----	----	----	----	11,740	------	------	------	----	------	------
		38.7	49.9	11.4	.4	----	----	----	----	12,250						
X8	1.8	26.1	23.6	48.5	.3	----	----	----	----	6,180	------	------	------	----	------	------
		26.6	24.0	49.4	.3	----	----	----	----	6,290						
X9	5.0	35.7	52.0	7.3	.6	----	----	----	----	11,810	------	------	------	----	------	------
		37.6	54.7	7.7	.6	----	----	----	----	12,440						
X10	6.7	35.9	50.9	6.5	.5	----	----	----	----	11,550	------	------	------	59.1	13,400	12,430
		38.4	54.6	7.0	.5	----	----	----	----	12,380						
X11	5.3	36.6	52.2	5.9	.5	----	----	----	----	11,970	------	------	------	59.2	13,570	12,800
		38.6	55.2	6.2	.5	----	----	----	----	12,640						
6954	23.3	25.4	25.1	26.2	.5	5.3	34.8	.5	32.7	5,810	------	------	------	52.0	12,020	8,100
		33.1	32.8	34.1	.7	3.5	45.3	.7	15.7	7,580						
		50.3	49.7	----	1.1	5.3	68.8	1.0	23.8	11,740						
[6]81606	21.0	37.6	31.1	10.3	.3	----	----	----	----	8,350	890	1,910	1,990	45.8	12,310	9,400
		47.5	39.5	13.0	.4	----	----	----	----	10,570						
[6]81607	22.4	37.7	31.5	8.4	.3	----	----	----	----	8,340	1,990	2,010	2,030	45.9	12,180	9,170
		48.6	40.6	10.8	.4	----	----	----	----	10,750						
[6]81608	21.1	36.0	33.7	9.2	.3	----	----	----	----	8,490	1,970	1,990	2,040	48.8	12,320	9,430
		45.7	42.7	11.6	.4	----	----	----	----	10,760						
[6]81609	21.6	38.1	31.2	9.1	.3	6.3	48.4	1.2	34.7	8,380	------	------	------	45.5	12,230	9,290
		48.7	39.5	11.8	.4	5.0	61.8	1.5	19.5	10,690						
		55.1	44.9	----	.5	5.7	69.9	1.7	22.2	12,100						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Cook Inlet field—Continued								
Kachemak Bay: Outcrop				M	1 2 3		86	4457
Do				M	1 2 3			4429
Do				M	1 2 3			4426
Do				M	1 2 3			4432
Port Graham: Outcrop				M	1 2 3		86	4458
Do				M	1 2			[6]17489
Tyonek: Outcrop				M	1 2 3		87	4425
Do				M	1 2 3			4464
Do				M	1 2 3			4465
Do				M	1 2 3			4434
Do				M	1 2 3			4456
Matanuska field								
Anthracite Ridge: Outcrop		An		M	1 2		87	2222
Do				M	1 2 3			4754
Do				M	1 2 3			17792
Do		An		M	1 2 3			12746
Do		Sa		M	1 2 3			12757
Do	No. 2	An		M	1 2 3			A3538
Do	No. 3	An		M	1 2 3			A3539
Do	No. 4	An		M	1 2 3			A3540

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Volatile matter	Fixed carbon	Ash	Ultimate, percent: Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
4457	18.1	42.8	23.6	15.5	0.4	5.5	44.8	0.9	32.9	7,900	------	------	------	36.2	12,130	9,490
		52.2	28.9	18.9	.5	4.3	54.7	1.1	20.5	9,640						
		64.4	35.6	----	.7	5.3	67.5	1.3	25.2	11,890						
4429	18.6	36.1	34.9	10.4	.3	5.8	49.1	1.1	33.3	8,550	------	------	------	49.7	12,190	9,630
		44.4	42.9	12.7	.4	4.6	60.3	1.4	20.6	10,500						
		50.9	49.1	----	.5	5.3	69.1	1.6	23.5	12,030						
4426	28.1	33.5	32.8	5.6	.2	6.5	45.6	.8	41.3	7,810	------	------	------	49.9	11,860	8,310
		46.6	45.6	7.8	.3	4.6	63.4	1.2	22.7	10,860						
		50.5	49.5	----	.3	5.0	68.8	1.3	24.6	11,780						
4432	20.0	35.9	29.1	15.0	.4	5.8	44.5	1.0	33.3	8,050	------	------	------	45.6	12,630	9,610
		44.8	36.5	18.7	.5	4.5	55.7	1.2	19.4	10,060						
		55.2	44.8	----	.6	5.5	68.5	1.5	23.9	12,380						
4458	20.0	38.7	32.5	8.8	.5	5.8	49.5	.9	34.5	8,790	------	------	------	46.1	12,480	9,720
		48.4	40.5	11.1	.7	4.5	61.9	1.1	20.7	10,990						
		54.4	45.6	----	.7	5.0	69.6	1.3	23.4	12,350						
[6]17489	20.4	32.7	34.3	12.6	.8	----	----	----	----	8,560	2,410	2,520	2,730+	52.2	13,000	9,910
		41.1	43.1	15.8	1.1	----	----	----	----	10,760						
4425	27.6	31.5	37.2	3.7	.4	6.5	48.0	.9	40.5	8,350	------	------	------	41.3	11,500	8,650
		43.5	51.3	5.2	.6	4.8	66.3	1.1	22.0	11,530						
		45.8	54.2	----	.6	5.1	69.9	1.2	23.2	12,160						
4464	20.7	41.8	29.1	8.4	.3	6.1	45.7	.8	38.7	7,990	------	------	------	41.4	11,380	8,790
		52.7	36.7	10.6	.4	4.8	57.6	1.0	25.6	10,080						
		58.9	41.1	----	.5	5.4	64.4	1.1	28.6	11,270						
4465	22.3	40.5	28.0	9.2	.3	6.2	44.2	.8	39.3	7,790	------	------	------	41.3	11,500	8,650
		52.1	36.0	11.9	.4	4.8	56.9	1.1	24.9	10,020						
		59.2	40.8	----	.4	5.4	54.6	1.2	28.4	11,370						
4434	19.4	34.4	29.8	16.4	.2	5.5	44.7	.8	32.4	7,990	------	------	------	47.5	12,710	9,710
		42.7	37.0	20.3	.3	4.1	55.5	1.0	18.8	9,900						
		53.6	46.4	----	.3	5.2	69.7	1.2	23.6	12,420						
4456	17.4	33.3	28.9	15.4	1.6	5.6	45.3	1.2	30.9	8,250	------	------	------	44.1	12,550	9,900
		46.3	35.0	18.7	2.0	4.4	54.8	1.4	18.7	9,990						
		57.0	43.0	----	2.4	5.5	67.4	1.7	23.0	12,280						
2222	2.6	7.1	84.3	6.0	.6	----	----	----	----	13,710	------	------	------	92.9	15,100	14,680
		7.3	86.5	6.2	.6	----	----	----	----	14,070						
4754	2.2	30.6	58.0	9.2	.7	4.8	71.4	1.5	12.4	13,150	------	------	------	----	------	------
		31.3	59.3	9.4	.7	4.7	73.0	1.5	10.7	13,440						
		34.5	65.5	----	.8	5.2	80.5	1.7	11.8	14,830						
17792	4.7	34.9	52.8	7.6	.5	5.5	71.8	1.3	13.3	12,750	2,730+	------	------	----	------	------
		36.6	55.4	8.0	.5	5.2	75.4	1.4	9.5	13,380						
		39.8	60.2	----	.5	5.7	81.9	1.5	10.4	14,550						
12746	2.9	7.8	77.3	12.0	.6	2.7	78.4	1.3	5.0	12,730	------	------	------	92.1	15,150	14,650
		8.0	79.6	12.4	.6	2.4	80.7	1.3	2.6	13,110						
		9.1	90.9	----	.7	2.8	92.1	1.4	3.0	14,960						
12757	3.1	10.0	71.0	15.9	.4	2.5	74.0	.8	6.4	11,930	------	------	------	89.2	14,980	14,420
		10.4	73.2	16.4	.4	2.3	76.4	.8	3.7	12,310						
		12.4	87.6	----	.4	2.7	91.3	1.0	4.6	14,720						
A3538	4.0	8.5	81.3	6.2	.5	3.1	82.7	1.3	6.2	13,410	2,250	2,330	2,420	----	------	------
		8.8	84.7	6.5	.6	2.8	86.2	1.3	2.6	13,970						
		9.5	90.5	----	.6	3.0	92.2	1.4	2.8	14,940						
A3539	3.2	8.0	84.7	4.1	.3	2.7	87.6	.7	4.6	13,760	2,230	2,280	2,330	----	------	------
		8.2	87.6	4.2	.3	2.5	90.5	.7	1.8	14,210						
		8.6	91.4	----	.3	2.6	94.5	.8	1.8	14,840						
A3540	4.7	9.1	80.0	6.2	.6	3.2	81.3	1.3	7.4	13,050	2,240	2,320	2,680	----	------	------
		9.5	84.0	6.5	.6	2.8	85.4	1.4	3.3	13,690						
		10.2	89.8	----	.7	3.0	91.3	1.4	3.6	14,650						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No. [5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Anthracite Ridge—Continued								
Prospect				M	1 2		88	X4488
Do		Sa		M	1 2			X4809
Do				M	1 2			X4484
Do		Sa		M	1 2			X4480
Do		Sa		M	1 2			X4490
Do		Sa		M	1 2			X4444
Do		Sa		M	1 2			X4486
Do				M	1 2			X4485
Do		Sa		M	1 2			X4443
Do		Sa		M	1 2			X4445
Do		Sa		M	1 2			X4446
Do		Sa		M	1 2			X4391
Do				M	1 2			X4466
Do				M	1 2			X4483
Do				M	1 2			X4482
Do				M	1 2			X4489
Do				M	1 2			X4481
Do				M	1 2			X4808
Chickaloon:								
Chickaloon (Navy).	No. 1	Lvb		M	1 2 3		89	83981
Do	do	Lvb		M	1 2 3			83982
Do	No. 3	Lvb		M	1 2			83174
Do	do	Lvb		M	1 2			85745
Do	do	Lvb		M	1 2			85746
Do	do	Lvb		M	1 2			85747
Do	do	Lvb	Composite of 85745 to 85747.	M	1 2 3			85748
Do	do	Lvb		M	1 2 3			85283
Do	do	Lvb		M	1 2 3			85284

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Fusibility of ash: Softening temperature, °F.	Fusibility of ash: Fluid temperature, °F.	Mineral-matter-free ba[sis]: Fixed carbon, dry basis, percent	Mineral-matter-free ba[sis]: Calorific value: B. t. u., dry basis	Mineral-matter-free ba[sis]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
X4488	2.2	16.0	78.0	3.8	0.6	----	----	----	----	14,130	----	----	----	----	----	----
		16.4	79.7	3.9	.6	----	----	----	----	14,450						
X4809	6.4	8.6	66.5	18.5	.3	----	----	----	----	10,800	----	----	----	----	----	----
		9.2	71.0	19.8	.3	----	----	----	----	11,540						
X4484	7.2	26.3	57.7	8.8	.7	----	----	----	----	11,580	----	----	----	----	----	----
		28.4	62.1	9.5	.8	----	----	----	----	12,490						
X4480	4.9	8.1	71.8	15.2	.7	----	----	----	----	11,690	----	----	----	----	----	----
		8.5	75.5	16.0	.7	----	----	----	----	12,300						
X4490	4.5	9.4	70.9	15.2	.3	----	----	----	----	11,770	----	----	----	----	----	----
		9.8	74.2	16.0	.3	----	----	----	----	12,330						
X4444	7.2	9.1	75.4	8.3	.2	----	----	----	----	12,530	----	----	----	----	----	----
		9.8	81.3	8.9	.2	----	----	----	----	13,510						
X4486	3.1	9.3	80.6	7.0	.7	----	----	----	----	13,430	----	----	----	----	----	----
		9.6	83.2	7.2	.7	----	----	----	----	13,860						
X4485	5.0	14.4	71.5	9.1	.7	----	----	----	----	12,670	----	----	----	----	----	----
		15.2	75.2	9.6	.7	----	----	----	----	13,340						
X4443	3.5	10.5	67.2	18.8	.2	----	----	----	----	11,340	----	----	----	----	----	----
		10.9	69.6	19.5	.2	----	----	----	----	11,750						
X4445	4.1	9.6	71.0	15.3	.5	----	----	----	----	11,850	----	----	----	----	----	----
		10.0	74.0	16.0	.5	----	----	----	----	12,360						
X4446	5.0	10.0	65.3	19.7	.5	----	----	----	----	10,870	----	----	----	----	----	----
		10.5	68.8	20.7	.5	----	----	----	----	11,450						
X4391	7.5	8.5	72.6	11.4	.5	----	----	----	----	11,870	----	----	----	----	----	----
		9.2	78.5	12.3	.5	----	----	----	----	12,830						
X4466	3.9	31.5	47.4	17.2	.6	----	----	----	----	11,300	----	----	----	----	----	----
		32.8	49.3	17.9	.6	----	----	----	----	11,770						
X4483	4.0	29.2	44.2	22.6	.6	----	----	----	----	10,120	----	----	----	----	----	----
		30.4	46.1	23.5	.6	----	----	----	----	10,550						
X4482	4.7	27.6	52.8	14.9	.6	----	----	----	----	11,480	----	----	----	----	----	----
		29.0	55.4	15.6	.6	----	----	----	----	12,040						
X4489	3.6	22.9	63.9	9.6	.5	----	----	----	----	12,860	----	----	----	----	----	----
		23.7	66.3	10.0	.5	----	----	----	----	13,340						
X4481	6.8	29.9	54.1	9.2	.6	----	----	----	----	11,510	----	----	----	----	----	----
		32.1	58.0	9.9	.7	----	----	----	----	12,350						
X4808	1.9	16.4	74.2	7.5	.7	----	----	----	----	13,850	----	----	----	----	----	----
		16.8	75.6	7.6	.7	----	----	----	----	14,110						
83981	2.0	17.8	62.1	18.1	.7	4.2	69.3	1.7	6.0	12,090	2,690	2,800	2,850	79.4	15,440	15,060
		18.2	63.3	18.5	.7	4.1	70.7	1.7	4.3	12,340						
		22.3	77.7	----	.9	5.0	86.7	2.1	5.3	15,140						
83982	1.8	17.9	66.7	13.6	.6	4.4	74.7	1.6	5.1	13,060	2,740	2,850	2,900	80.1	15,660	15,330
		18.2	68.0	13.8	.6	4.3	76.1	1.6	3.6	13,300						
		21.1	78.9	----	.7	5.0	88.3	1.9	4.1	15,430						
83174	1.5	18.6	65.9	14.0	.6	----	----	----	----	12,900	2,150	2,450	2,570	79.2	15,500	15,220
		18.9	66.9	14.2	.6	----	----	----	----	13,100						
85745	1.8	17.0	66.6	14.6	.6	----	----	----	----	12,900	2,180	2,390	2,450	81.0	15,680	15,340
		17.3	67.8	14.9	.6	----	----	----	----	13,140						
85746	1.4	18.4	72.2	8.0	.7	----	----	----	----	14,020	2,040	2,200	2,340	80.5	15,610	15,370
		18.6	73.3	8.1	.7	----	----	----	----	14,220						
85747	1.8	19.3	64.7	14.2	.7	----	----	----	----	12,770	1,960	2,210	2,310	78.3	15,440	15,110
		19.7	65.8	14.5	.7	----	----	----	----	12,990						
85748	1.6	18.3	66.9	13.2	.7	4.3	76.1	1.4	4.3	13,190	----	----	----	79.8	15,710	15,410
		18.6	68.0	13.4	.7	4.2	77.3	1.5	2.9	13,400						
		21.4	78.6	----	.8	4.8	89.3	1.7	3.4	15,480						
85283	1.2	18.2	71.5	9.1	.7	4.4	79.5	1.5	4.8	13,750	1,920	2,130	2,250	80.6	15,480	15,280
		18.5	72.3	9.2	.7	4.3	80.5	1.5	3.8	13,920						
		20.3	79.7	----	.7	4.7	88.7	1.6	4.3	15,330						
85284	1.9	20.8	66.9	10.4	.7	4.3	77.0	1.5	6.1	13,260	1,990	2,060	2,180	77.2	15,290	14,960
		21.2	68.2	10.6	.7	4.2	78.5	1.5	4.5	13,510						
		23.7	76.3	----	.8	4.7	87.9	1.7	4.9	15,120						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2 3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Chickaloon—Con. Chickaloon (Navy).	No. 4	Lvb		M	1 2 3		88	83983
Do	No. 5	Lvb		M	1 2			83173
Do	Upper No. 5	Lvb		M	1 2			85749
Do	do	Lvb		M	1 2			85750
Do	do	Lvb		M	1 2			85751
Do	do	Lvb		M	1 2			85752
Do	do	Lvb		M	1 2			85753
Do	do	Lvb	Composite of 85749 to 85753.	M	1 2 3			85754
Do	No. 6	Lvb		M	1 2 3			85285
Do	No. 8	Lvb		M	1 2			85740
Do	do	Lvb		M	1 2			85741
Do	do	Lvb		M	1 2			85742
Do	do	Lvb		M	1 2			85743
Do	do	Lvb	Composite of 85740 to 85743.	M	1 2 3			85744
Do	No. 10	Lvb		M	1 2 3			83984
Do	do	Lvb		M	1 2 3			85755
Coal Creek (Navy).	Bardin	Mvb		M	1 2 3		91	85282
Do	North Spaulding	Mvb		M	1 2 3			83985
Do	do	Mvb		M	1 2 3			85277
Do	do	Mvb		M	1 2 3			85278
Do	do	Lvb		M	1 2 3			85279
Do	North Tierney	Lvb		M	1 2 3			83986
Do	do	Lvb		M	1 2 3			83987

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis[1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, °F.	Softening temperature, °F.	Fluid temperature, °F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
83983	1.7	15.0	56.0	27.3	0.5	3.7	61.8	1.2	5.5	10,740	2,660	2,830	2,880	81.6	15,630	15,250
		15.3	56.9	27.8	.5	3.6	62.9	1.2	4.0	10,930						
		21.2	78.8	----	.7	5.0	87.1	1.7	5.5	15,140						
83173	1.5	15.3	53.5	29.7	.5	----	----	----	----	10,270	2,740	2,850	2,900	80.7	15,490	15,150
		15.5	54.4	30.1	.5	----	----	----	----	10,420						
85749	1.2	19.6	63.9	15.3	.6	----	----	----	----	12,630	1,910	2,240	2,390	77.9	15,380	15,150
		19.9	64.6	15.5	.6	----	----	----	----	12,780						
85750	1.3	17.4	66.1	15.2	.6	----	----	----	----	12,880	2,710	2,760	2,870	80.5	15,680	15,440
		17.7	66.9	15.4	.6	----	----	----	----	13,050						
85751	1.2	17.8	67.9	13.1	.6	----	----	----	----	13,290	2,690	2,800	2,850	80.4	15,730	15,510
		18.0	68.8	13.2	.6	----	----	----	----	13,440						
85752	1.4	17.5	62.1	19.0	.5	----	----	----	----	12,220	2,720	2,830	2,880	79.7	15,670	15,400
		17.7	63.1	19.2	.5	----	----	----	----	12,390						
85753	1.3	19.2	60.0	19.5	.5	----	----	----	----	11,960	2,120	2,370	2,520	77.4	15,430	15,170
		19.5	60.8	19.7	.5	----	----	----	----	12,120						
85754	1.3	18.4	63.9	16.4	.5	4.3	72.1	1.4	5.3	12,590	-------	-------	-------	79.0	15,570	15,320
		18.7	64.7	16.6	.5	4.2	73.1	1.5	4.1	12,750						
		22.4	77.6	----	.6	5.0	87.6	1.7	5.1	15,300						
85285	3.5	19.6	67.2	9.7	.8	4.7	76.6	1.4	6.8	13,420	2,240	2,340	2,390	78.4	15,630	15,020
		20.3	69.6	10.1	.8	4.5	79.3	1.4	3.9	13,910						
		22.5	77.5	----	.9	5.0	88.2	1.6	4.3	15,460						
85740	1.3	16.2	66.4	16.1	.6	----	----	----	----	12,690	2,200	2,390	2,620	81.9	15,630	15,390
		16.4	67.3	16.3	.6	----	----	----	----	12,850						
85741	2.0	18.8	60.2	19.0	.5	----	----	----	----	12,160	2,180	2,390	2,510	77.8	15,710	15,310
		19.2	61.4	19.4	.5	----	----	----	----	12,390						
85742	1.7	19.2	62.5	16.6	.6	----	----	----	----	12,450	2,200	2,390	2,570	78.0	15,520	15,190
		19.5	63.5	17.0	.6	----	----	----	----	12,670						
85743	2.2	18.5	62.8	16.5	.5	----	----	----	----	12,530	2,200	2,450	2,630	78.7	15,690	15,270
		18.9	64.2	16.9	.5	----	----	----	----	12,800						
85744	1.8	18.1	63.0	17.1	.5	4.2	71.4	1.3	5.5	12,440	-------	-------	-------	79.2	15,630	15,280
		18.4	64.2	17.4	.5	4.1	72.7	1.4	3.9	12,670						
		22.3	77.7	----	.6	4.9	88.0	1.6	4.9	15,340						
83984	2.3	20.4	65.1	12.2	.7	4.4	74.8	1.5	6.4	13,090	2,200	2,280	2,390	77.3	15,520	15,100
		20.9	66.6	12.5	.7	4.2	76.6	1.5	4.5	13,400						
		23.9	76.1	----	.8	4.8	87.5	1.7	5.2	15,310						
85755	1.0	15.9	59.3	23.8	.6	3.9	65.6	1.3	4.8	11,350	2,740	2,850	2,900	81.1	15,510	15,300
		16.1	59.9	24.0	.6	3.8	66.3	1.3	4.0	11,460						
		21.2	78.8	----	.8	5.0	87.2	1.7	5.3	15,090						
85282	1.5	19.3	56.3	22.9	.8	4.2	64.3	1.7	6.1	11,400	2,720	2,830	2,880	76.6	15,490	15,180
		19.6	57.1	23.3	.8	4.0	65.3	1.7	4.9	11,580						
		25.6	74.4	----	1.0	5.3	85.1	2.3	6.3	15,090						
83985	1.6	22.9	69.7	5.8	.6	4.8	81.7	2.0	5.1	14,380	2,340	2,450	2,570	75.8	15,630	15,360
		23.3	70.8	5.9	.6	4.7	83.0	2.0	3.8	14,610						
		24.8	75.2	----	.6	5.0	88.2	2.1	4.1	15,530						
85277	2.7	20.7	59.1	17.5	.6	4.6	69.6	1.6	6.1	12,180	2,340	2,510	2,570	75.6	15,560	15,040
		21.2	60.8	18.0	.6	4.4	71.6	1.6	3.8	12,510						
		25.9	74.1	----	.8	5.4	87.2	2.0	4.6	15,250						
85278	2.0	22.3	60.5	15.2	.6	4.5	72.1	1.7	5.9	12,620	1,910	2,200	2,280	74.3	15,500	15,120
		22.8	61.7	15.5	.6	4.3	73.6	1.7	4.3	12,880						
		27.0	73.0	----	.7	5.1	87.1	2.0	5.1	15,240						
85279	4.1	13.8	70.5	11.6	.6	3.9	74.0	1.9	8.0	12,600	2,060	2,240	2,390	84.8	15,140	14,430
		14.4	73.6	12.0	.6	3.6	77.2	2.0	4.6	13,140						
		16.4	83.6	----	.7	4.1	87.8	2.3	5.1	14,940						
83986	3.2	18.6	66.0	12.2	.6	4.6	74.3	1.7	6.6	12,970	2,600	2,770	2,830	79.1	15,540	14,960
		19.2	68.2	12.6	.6	4.3	76.8	1.8	3.9	13,400						
		22.0	78.0	----	.7	4.9	87.9	2.1	4.4	15,330						
83987	2.9	22.0	68.7	6.4	.6	4.9	80.0	1.8	6.3	14,020	2,280	2,390	2,450	76.3	15,570	15,080
		22.7	70.7	6.6	.6	4.7	82.4	1.9	3.8	14,440						
		24.3	75.7	----	.6	5.0	88.2	2.0	4.2	15,460						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Chickaloon—Con. Coal Creek (Navy).	Olson	Mvb		M	1 2 3		91	80608
Do	do	Mvb		M	1 2 3			85640
Do	Spaulding	Mvb		M	1 2 3			80607
Do			Run-of-mine	D **2**	1 2		108	31
Do			Smithing	D **2**	1 2			32
Do	Olson		do	D **2**	1 2			33
Do			Run-of-mine	D	1 2			34
Eska:								
Eska	David	Hvbb		M	1 2 3		93	28733
Do	Emery	Hvbb		M	1 2 3			28735
Do	Eska (Upper)	Hvbb		M	1 2 3			28734
Do	Maitland (Kelly) (upper bench).	Hvbb		M	1 2 3			28731
Do	Maitland (Kelly) (lower bench).	Hvbb		M	1 2 3			28732
Do	Upper Shaw	Hvab		M	1 2 3	Cf		B67588
Do			Run-of-mine	D **3**	1 2		109	35
Do			do	D **6**	1 2			36
Do			do	D **3**	1 2			37
Do			do	D **7**	1 2			38
Do			do	D **11**	1 2			39
Do			do	D **12**	1 2			40
Do			do	D **8**	1 2			41
Do			do	D **7**	1 2			42
Do			Lump	D **3**	1 2			43
Do			Lump and nut	D **2**	1 2			44
Do			Nut (washed)	D **4**	1 2			45

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Volatile matter	Fixed carbon	Ash	Ultimate, percent: Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Softening temperature, °F.	Fluid temperature, °F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
80608	1.4	20.5	59.7	18.4	0.5	4.4	70.6	1.6	4.5	12,410	------	------	------	76.0	15,790	15,510
		20.8	60.6	18.6	.5	4.3	71.6	1.7	3.3	12,580						
		25.5	74.5	----	.6	5.3	87.9	2.0	4.2	15,460						
85640	1.1	21.7	59.7	17.5	.6	4.5	70.8	1.6	5.0	12,410	2,440	2,620	2,740	74.8	15,540	15,330
		21.9	60.4	17.7	.6	4.4	71.5	1.7	4.1	12,550						
		26.7	73.3	----	.7	5.4	86.9	2.0	5.0	15,250						
80607	1.5	21.2	61.0	16.3	.4	4.5	72.0	1.7	5.1	12,700	2,390	2,740	------	75.5	15,720	15,430
		21.5	62.0	16.5	.4	4.4	73.0	1.7	4.0	12,890						
		25.7	74.3	----	.5	5.3	87.5	2.1	4.6	15,430						
31	2.4	21.9	68.4	7.3	.6	----	----	----	----	14,240	------	------	------	----	------	------
		22.4	70.1	7.5	.6	----	----	----	----	14,590						
32	2.2	21.4	67.7	8.7	.5	----	----	----	----	13,650	------	------	------	----	------	------
		21.8	69.3	8.9	.5	----	----	----	----	13,950						
33	2.9	20.5	68.7	7.9	.6	----	----	----	----	13,880	------	------	------	----	------	------
		21.1	70.8	8.1	.6	----	----	----	----	14,300						
34	1.6	22.0	66.6	9.8	.5	----	----	----	----	13,640	------	------	------	----	------	------
		22.4	67.6	10.0	.5	----	----	----	----	13,860						
28733	4.9	41.6	48.0	5.5	.5	6.0	71.9	1.6	14.5	13,030	------	------	------	53.9	14,630	13,870
		43.7	50.5	5.8	.6	5.7	75.6	1.7	10.6	13,710						
		46.4	53.6	----	.6	6.0	80.3	1.8	11.3	14,550						
28735	5.4	39.1	45.8	9.7	.3	5.7	68.5	1.5	14.3	12,370	------	------	------	54.4	14,720	13,830
		41.4	48.3	10.3	.4	5.3	72.5	1.6	9.9	13,080						
		46.1	53.9	----	.4	6.0	80.7	1.8	11.1	14,580						
28734	4.9	38.0	39.6	17.5	.4	5.4	62.0	1.4	13.3	11,150	------	------	------	52.0	14,650	13,760
		40.0	41.6	18.4	.4	5.1	65.2	1.5	9.4	11,730						
		49.0	51.0	----	.5	6.3	79.9	1.8	11.5	14,370						
28731	4.8	41.6	46.7	6.9	.5	5.9	71.2	1.6	13.9	12,890	------	------	------	53.3	14,710	13,950
		43.8	48.9	7.3	.6	5.7	74.8	1.7	9.9	13,550						
		47.2	52.8	----	.6	6.1	80.7	1.9	10.7	14,610						
28732	5.1	42.0	44.1	8.8	.4	5.7	69.0	1.5	14.6	12,350	------	------	------	51.7	14,480	13,660
		44.3	46.4	9.3	.4	5.4	72.7	1.6	10.6	13,020						
		48.8	51.2	----	.5	5.9	80.1	1.8	11.7	13,720						
B67588	3.7	41.0	44.4	10.9	.5	5.7	69.2	1.5	12.2	12,410	2,400	2,570	2,890	52.6	14,700	14,080
		42.6	46.1	11.3	.5	5.5	71.8	1.5	9.4	12,890						
		48.0	52.0	----	.6	6.2	81.0	1.7	10.5	14,540						
35	4.8	39.8	41.5	13.9	.3	----	----	----	----	11,580	------	------	------	----	------	------
		41.8	43.6	14.6	.3	----	----	----	----	12,160						
36	3.9	40.1	39.2	16.8	.4	----	----	----	----	11,310	------	------	------	----	------	------
		41.7	40.8	17.5	.4	----	----	----	----	11,770						
37	5.0	37.7	39.9	17.4	.3	----	----	----	----	11,090	------	------	------	----	------	------
		39.7	42.0	18.3	.3	----	----	----	----	11,670						
38	4.7	38.9	40.6	15.8	.4	----	----	----	----	11,460	------	------	------	----	------	------
		40.8	42.6	16.6	.4	----	----	----	----	12,030						
39	4.9	35.8	35.9	23.4	.3	----	----	----	----	10,290	------	------	------	----	------	------
		37.6	37.8	24.6	.3	----	----	----	----	10,820						
40	4.5	34.3	33.6	27.6	.3	----	----	----	----	9,630	------	------	------	----	------	------
		35.9	35.2	28.9	.3	----	----	----	----	10,080						
41	4.5	34.9	34.6	26.0	.4	----	----	----	----	10,110	------	------	------	----	------	------
		36.5	36.3	27.2	.4	----	----	----	----	10,590						
42	5.2	34.3	35.7	24.8	.3	----	----	----	----	10,130	------	------	------	----	------	------
		36.2	37.6	26.2	.3	----	----	----	----	10,690						
43	3.7	39.3	35.9	21.1	.3	----	----	----	----	10,630	------	------	------	----	------	------
		40.8	37.3	21.9	.3	----	----	----	----	11,040						
44	2.7	42.0	37.8	17.5	.5	----	----	----	----	11,400	------	------	------	----	------	------
		43.2	38.8	18.0	.5	----	----	----	----	11,720						
45	5.1	36.1	36.2	22.6	.3	----	----	----	----	10,350	------	------	------	----	------	------
		38.0	38.2	23.8	.3	----	----	----	----	10,910						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2, 3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Eska—Continued.								
Eska			Engine (washed)	D **3**	1 2		109	46
Do			Steam	D **5**	1 2			47
McCauley prospect.	McCauley			M	1 2 3		94	28836
Eska Creek: Outcrop				M	1 2 3		94	29362
Jonesville:								
Evan Jones	No. 00	Hvbb		M	1 2 3		94	A11087
Do	No. 0	Hvbb		M	1 2 3			A11083
Do	No. 2	Hvbb		M	1 2 3			89706
Do	No. 3	Hvbb		M	1 2			89705
Do	do	Hvbb		M	1 2 3			A11084
Do	No. 4	Hvbb		M	1 2			89707
Do	do	Hvbb		M	1 2			89708
Do	No. 5	Hvbb		M	1 2 3			A11086
Do	No. 6	Hvbb		M	1 2 3			A11085
Do	No. 8	Hvbb		M	1 2 3			A98201
Do	do	Hvbb		M	1 2 3	Cf		B25076
Do	do	Hvbb		M	1 2 3	Cf		B25077
Do	No. 10	Hvbb		M	1 2 3	Cp		B56287
Do			Run-of-mine	D **2**	1 2		109	48
Do			Lump (washed)	D **2**	1 2			49
Do			do	D	1 2			50
Do			Lump	D **2**	1 2			51
Do			do	D	1 2			52

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, ° F.	Fusibility of ash: Softening temperature, ° F.	Fusibility of ash: Fluid temperature, ° F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
46	6.4	35.5	37.8	20.3	0.3	----	----	----	----	10,590	-------	-------	-------	----	------	------
		37.9	40.4	21.7	.3	----	----	----	----	11,310						
47	3.9	40.4	39.0	16.7	.4	----	----	----	----	11,320	-------	-------	-------	----	------	------
		42.0	40.6	17.4	.4	----	----	----	----	11,780						
28836	6.8	37.1	46.8	9.3	.5	5.8	66.5	1.2	16.7	11,890	-------	-------	-------	----	------	------
		39.8	50.2	10.0	.6	5.4	71.3	1.3	11.4	12,760						
		44.2	55.8	----	.6	6.0	79.2	1.4	12.8	14,170						
29362	5.8	37.9	39.7	16.6	.3	5.4	61.0	1.5	15.2	11,090						
		40.3	42.1	17.6	.3	5.0	64.8	1.6	10.7	11,770	-------	-------	-------	----	------	------
		48.9	51.1	----	.4	6.1	78.6	1.9	13.0	14,290						
A11087	3.6	35.5	39.3	21.6	.5	4.7	58.6	1.2	13.4	10,440	2,050	2,310	2,470	53.9	14,310	13,630
		36.8	40.7	22.5	.5	4.4	60.9	1.3	10.4	10,830						
		47.5	52.5	----	.6	5.7	78.5	1.6	13.6	13,970						
A11083	3.5	35.4	37.4	23.7	.4	4.8	57.4	1.3	12.4	10,290	2,720	2,740	2,800	52.8	14,530	13,840
		36.7	38.8	24.5	.4	4.6	59.5	1.3	9.7	10,650						
		48.6	51.4	----	.5	6.1	78.8	1.7	12.9	14,120						
89706	4.2	37.0	38.5	20.3	.4	----	----	----	----	10,620	-------	-------	-------	52.1	14,390	13,610
		38.6	40.2	21.2	.4	----	----	----	----	11,090						
		49.0	51.0	----	.5	----	----	----	----	14,060						
89705	3.9	38.9	43.0	14.2	.4	----	----	----	----	11,650	-------	-------	-------	53.3	14,440	13,770
		40.5	44.8	14.7	.4	----	----	----	----	12,120						
A11084	3.5	37.3	40.2	19.0	.3	5.1	61.1	1.2	13.3	10,990	2,400	2,580	2,680	52.9	14,480	13,840
		38.7	41.6	19.7	.3	4.9	63.3	1.3	10.5	11,380						
		48.2	51.8	----	.4	6.1	78.8	1.6	13.1	14,170						
89707	4.2	38.5	41.7	15.6	.3	----	----	----	----	11,210	-------	-------	-------	52.8	14,210	13,490
		40.2	43.5	16.3	.3	----	----	----	----	11,700						
89708	4.5	38.2	42.6	14.7	.4	----	----	----	----	11,490	-------	-------	-------	53.5	14,450	13,670
		40.0	44.6	15.4	.4	----	----	----	----	12,030						
A11086	3.5	36.8	38.4	21.3	.2	4.8	58.7	1.3	13.7	10,450	2,150	2,370	2,460	52.3	14,230	13,580
		38.1	39.8	22.1	.3	4.5	60.9	1.4	10.8	10,830						
		48.9	51.1	----	.3	5.8	78.1	1.7	14.1	13,900						
A11085	3.8	37.9	43.3	15.0	.3	5.3	64.4	1.5	13.5	11,540	2,680	2,740	-------	54.1	14,440	13,780
		39.4	45.0	15.6	.3	5.0	66.9	1.6	10.6	12,000						
		46.6	53.4	----	.3	5.9	79.3	1.8	12.7	14,220						
A98201	5.2	34.7	41.4	18.7	.4	5.2	60.6	1.3	13.8	10,860	2,960+	-------	-------	55.5	14,570	13,620
		36.6	43.6	19.8	.5	4.9	64.0	1.3	9.5	11,460						
		45.7	54.3	----	.6	6.1	79.7	1.7	11.9	14,280						
B25076	3.4	38.7	46.1	11.8	.5	5.4	66.6	1.2	14.5	11,890	2,450	2,680	2,830	55.0	14,200	13,640
		40.1	47.7	12.2	.5	5.2	69.0	1.3	11.8	12,320						
		45.6	54.4	----	.6	5.9	78.6	1.5	13.4	14,030						
B25077	4.2	35.9	40.2	19.7	.4	5.0	61.0	1.2	12.7	10,850	2,840	2,900	2,920+	54.0	14,580	13,800
		37.5	42.0	20.5	.4	4.8	63.6	1.2	9.5	11,320						
		47.2	52.8	----	.6	6.0	80.0	1.5	11.9	14,250						
B56287	5.0	33.7	39.6	21.7	.4	5.1	58.9	1.3	12.6	10,550	2,910+	-------	-------	55.4	14,760	13,790
		35.4	41.8	22.8	.4	4.8	62.0	1.3	8.7	11,110						
		45.9	54.1	----	.6	6.2	80.3	1.7	11.2	14,400						
48	7.6	37.4	43.4	11.6	.3	----	----	----	----	11,450	-------	-------	-------	----	------	------
		40.5	46.9	12.6	.3	----	----	----	----	12,390						
49	6.5	37.9	44.1	11.5	.3	----	----	----	----	11,920	-------	-------	-------	----	------	------
		40.5	47.2	12.3	.3	----	----	----	----	12,750						
50	7.0	37.2	44.5	11.3	.2	----	----	----	----	11,680	-------	-------	-------	----	------	------
		40.0	47.8	12.2	.2	----	----	----	----	12,560						
51	3.4	41.0	45.0	10.6	.3	----	----	----	----	12,080	-------	-------	-------	----	------	------
		42.4	46.6	11.0	.3	----	----	----	----	12,490						
52	2.0	40.8	48.0	9.2	.3	----	----	----	----	12,420	-------	-------	-------	----	------	------
		41.6	49.0	9.4	.3	----	----	----	----	12,670						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Jonesville—Con. Evan Jones	----------	------	Lump (washed)	D	1 2	-----	109	53
Do	----------	------	Lump	D **2**	1 2	-----		54
Do	----------	------	do	D	1 2	-----		55
Do	----------	------	Lump nut (sacked)	D **3**	1 2	-----		56
Do	----------	------	do	D **27**	1 2	-----		57
Do	----------	------	Lump nut	D	1 2	-----		58
Do	----------	------	do	D **5**	1 2	-----		59
Do	----------	------	do	D **4**	1 2	-----		60
Do	----------	------	do	D **6**	1 2	-----		61
Do	----------	------	do	D **13**	1 2	-----		62
Do	----------	------	do	D **3**	1 2	-----		63
Do	----------	------	do	D **6**	1 2	-----		64
Do	----------	------	do	D **17**	1 2	-----		65
Do	----------	------	do	D **13**	1 2	-----		66
Do	----------	------	do	D **3**	1 2	-----		67
Do	----------	------	Nut	D **4**	1 2	-----		68
Do	----------	------	do	D **7**	1 2	-----		69
Do	----------	------	do	D **9**	1 2	-----		70
Do	----------	------	do	D	1 2	-----		71
Do	----------	------	do	D **10**	1 2	-----		72
Do	----------	------	do	D **3**	1 2	-----		73
Do	----------	------	do	D **6**	1 2	-----		74
Do	----------	------	Nut and steam	D **2**	1 2	-----		75
Do	----------	------	do	D	1 2	-----		76
Do	----------	------	do	D **4**	1 2	-----		77
Do	----------	------	Chestnut	D **10**	1 2	-----		78
Do	----------	------	do	D **7**	1 2	-----		79
Do	----------	------	Chestnut and steam	D	1 2	-----		80
Do	----------	------	Pea (washed)	D	1 2	-----		81
Do	----------	------	Pea	D	1 2	-----		82

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, ° F.	Fusibility of ash: Softening temperature, ° F.	Fusibility of ash: Fluid temperature, ° F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
53	4.1	39.2	46.8	9.9	0.3	----	----	----	----	12,220	----	----	----	----	----	----
		40.9	48.8	10.3	.3	----	----	----	----	12,740						
54	5.6	40.2	44.6	9.6	.2	----	----	----	----	12,070	----	----	----	----	----	----
		42.6	47.2	10.2	.2	----	----	----	----	12,790						
55	5.4	39.2	46.6	8.8	.3	----	----	----	----	12,040	----	----	----	----	----	----
		41.4	49.3	9.3	.3	----	----	----	----	12,730						
56	4.2	37.6	43.9	14.3	.2	----	----	----	----	11,670	----	----	----	----	----	----
		39.2	45.8	15.0	.2	----	----	----	----	12,180						
57	3.3	39.4	46.9	10.4	.3	----	----	----	----	12,230	----	----	----	----	----	----
		40.7	48.5	10.8	.3	----	----	----	----	12,650						
58	5.2	41.0	43.8	10.0	.3	----	----	----	----	12,390	----	----	----	----	----	----
		43.2	46.2	10.6	.3	----	----	----	----	13,070						
59	4.8	40.7	46.4	8.1	.4	----	----	----	----	12,400	----	----	----	----	----	----
		42.7	48.8	8.5	.4	----	----	----	----	13,030						
60	5.0	40.7	46.3	8.0	.3	----	----	----	----	12,440	----	----	----	----	----	----
		42.8	48.8	8.4	.3	----	----	----	----	13,090						
61	5.1	40.4	45.0	9.5	.3	----	----	----	----	12,050	----	----	----	----	----	----
		42.6	47.4	10.0	.3	----	----	----	----	12,700						
62	6.1	38.4	44.4	11.1	.3	----	----	----	----	11,710	----	----	----	----	----	----
		40.9	47.3	11.8	.3	----	----	----	----	12,470						
63	5.4	38.4	46.1	10.1	.3	----	----	----	----	12,000	----	----	----	----	----	----
		40.6	48.7	10.7	.3	----	----	----	----	12,690						
64	5.1	38.8	44.8	11.3	.3	----	----	----	----	12,030	----	----	----	----	----	----
		40.9	47.2	11.9	.3	----	----	----	----	12,680						
65	5.2	37.9	40.4	16.5	.3	----	----	----	----	11,210	----	----	----	----	----	----
		40.0	42.6	17.4	.3	----	----	----	----	11,820						
66	4.5	38.1	38.1	19.3	.5	----	----	----	----	10,940	----	----	----	----	----	----
		39.9	39.9	20.2	.5	----	----	----	----	11,460						
67	4.2	38.3	38.1	19.4	.3	----	----	----	----	10,810	----	----	----	----	----	----
		40.0	39.8	20.2	.3	----	----	----	----	11,280						
68	4.8	41.3	45.0	8.9	.3	----	----	----	----	12,280	----	----	----	----	----	----
		43.4	47.2	9.4	.3	----	----	----	----	12,900						
69	6.5	39.0	43.9	10.6	.3	----	----	----	----	11,760	----	----	----	----	----	----
		41.7	47.0	11.3	.3	----	----	----	----	12,580						
70	5.2	38.8	46.0	10.0	.3	----	----	----	----	12,080	----	----	----	----	----	----
		40.9	48.5	10.6	.3	----	----	----	----	12,740						
71	4.9	39.7	46.5	8.9	.3	----	----	----	----	12,270	----	----	----	----	----	----
		41.7	48.9	9.4	.3	----	----	----	----	12,910						
72	4.6	38.6	41.1	15.7	.3	----	----	----	----	11,320	----	----	----	----	----	----
		40.5	43.0	16.5	.3	----	----	----	----	11,870						
73	5.1	36.6	37.7	20.6	.3	----	----	----	----	10,490	----	----	----	----	----	----
		38.6	39.7	21.7	.3	----	----	----	----	11,050						
74	4.5	37.4	38.8	19.3	.3	----	----	----	----	10,820	----	----	----	----	----	----
		39.2	40.6	20.2	.3	----	----	----	----	11,330						
75	7.1	37.7	43.5	11.7	.2	----	----	----	----	11,510	----	----	----	----	----	----
		40.6	46.8	12.6	.3	----	----	----	----	12,390						
76	8.9	36.4	43.8	10.9	.3	----	----	----	----	11,380	----	----	----	----	----	----
		40.0	48.0	12.0	.3	----	----	----	----	12,490						
77	7.0	36.4	40.0	16.6	.4	----	----	----	----	11,000	----	----	----	----	----	----
		39.1	43.1	17.8	.4	----	----	----	----	11,830						
78	5.5	37.4	47.4	9.7	.3	----	----	----	----	12,260	----	----	----	----	----	----
		39.6	50.1	10.3	.3	----	----	----	----	12,970						
79	5.2	39.0	46.4	9.4	.3	----	----	----	----	12,260	----	----	----	----	----	----
		41.1	49.0	9.9	.3	----	----	----	----	12,930						
80	6.5	36.7	44.5	12.3	.3	----	----	----	----	11,490	----	----	----	----	----	----
		39.2	47.6	13.2	.3	----	----	----	----	12,300						
81	5.1	37.9	46.5	10.5	.2	----	----	----	----	12,030	----	----	----	----	----	----
		39.9	49.0	11.1	.2	----	----	----	----	12,680						
82	6.3	36.8	46.2	10.7	.2	----	----	----	----	11,970	----	----	----	----	----	----
		39.3	49.3	11.4	.2	----	----	----	----	12,780						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2 3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued:								
Jonesville—Con. Evan Jones			Pea	D	1 2		109	83
Do			do	D	1 2			84
Do			Locomotive	D **10**	1 2			85
Do			Steam (washed)	D **12**	1 2			86
Do			Steam	D	1 2			87
Do			do	D **69**	1 2			88
Do			do	D **11**	1 2			89
Do			do	D **12**	1 2			90
Do			do	D **15**	1 2			91
Do			do	D **19**	1 2			92
Do			do	D **12**	1 2			93
Do			do	D **31**	1 2			94
Do			do	D **17**	1 2			95
Do			do	D **17**	1 2			96
Kings River: Outcrop				M	1 2		96	2218
Do	No. 1	Mvb		M	1 2 3			18137
Do	do	Mvb		M	1 2			18319
Do	do	Coke[7]		M	1 2 3			18136
Do	do	do[7]		M	1 2 3			18147
Do	No. 2	Mvb		M	1 2 3			18151
Matanuska River: Outcrop.				M	1 2 3		98	18144
MooseCreek(Station): Baxter	"Big"	Hvbb		M	1 2		98	85511
Do	do	Hvbb		M	1 2			85512
Do	do	Hvbb		M	1 2			85513
Do	do	Hvbb	Composite of 85511 to 85513.	M	1 2 3			85514

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, °F.	Fusibility of ash: Softening temperature, °F.	Fusibility of ash: Fluid temperature, °F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
83	5.6	37.6	47.9	8.9	0.3	----	----	----	----	12,260	------	------	------	----	------	------
		39.8	50.8	9.4	.3	----	----	----	----	12,990						
84	4.0	40.0	45.2	10.8	.3	----	----	----	----	12,090	------	------	------	----	------	------
		41.7	47.1	11.2	.3	----	----	----	----	12,590						
85	6.9	37.3	44.6	11.2	.3	----	----	----	----	11,630	------	------	------	----	------	------
		40.1	47.9	12.0	.3	----	----	----	----	12,490						
86	7.0	37.2	44.5	11.3	.2	----	----	----	----	11,710	------	------	------	----	------	------
		40.0	47.9	12.1	.2	----	----	----	----	12,590						
87	6.3	38.9	44.7	10.1	.2	----	----	----	----	11,940	------	------	------	----	------	------
		41.5	47.7	10.8	.2	----	----	----	----	12,740						
88	7.1	37.3	43.2	12.4	.3	----	----	----	----	11,500	------	------	------	----	------	------
		40.2	46.5	13.3	.3	----	----	----	----	12,380						
89	7.0	37.4	43.8	11.8	.3	----	----	----	----	11,470	------	------	------	----	------	------
		40.2	47.1	12.7	.3	----	----	----	----	12,330						
90	7.2	38.6	42.2	12.0	.3	----	----	----	----	11,430	------	------	------	----	------	------
		41.6	45.5	12.9	.3	----	----	----	----	12,320						
91	8.9	36.3	42.5	12.3	.3	----	----	----	----	11,180	------	------	------	----	------	------
		39.9	46.6	13.5	.3	----	----	----	----	12,270						
92	8.5	36.1	42.5	12.9	.3	----	----	----	----	11,210	------	------	------	----	------	------
		39.5	46.4	14.1	.3	----	----	----	----	12,250						
93	8.3	36.0	42.1	13.6	.3	----	----	----	----	11,100	------	------	------	----	------	------
		39.3	45.9	14.8	.3	----	----	----	----	12,110						
94	8.2	36.4	40.0	15.4	.3	----	----	----	----	10,850	------	------	------	----	------	------
		39.6	43.6	16.8	.3	----	----	----	----	11,820						
95	7.3	36.8	40.3	15.6	.3	----	----	----	----	11,020	------	------	------	----	------	------
		39.7	43.5	16.8	.3	----	----	----	----	11,890						
96	7.4	36.7	41.0	14.9	.3	----	----	----	----	11,100	------	------	------	----	------	------
		39.6	44.3	16.1	.3	----	----	----	----	11,990						
2218	2.9	21.9	63.1	12.1	.6	----	----	----	----	13,350	------	------	------	----	------	------
		22.5	65.0	12.5	.6	----	----	----	----	13,760						
18137	2.4	23.6	63.1	10.9	.5	4.7	76.8	1.1	6.0	13,420	2,420	2,570	2,740	73.6	15,660	15,230
		24.2	64.6	11.2	.5	4.6	78.6	1.2	3.9	13,740						
		27.2	72.8	----	.6	5.2	88.5	1.3	4.4	15,470						
18319	1.8	23.2	66.4	8.6	.6	----	----	----	----	13,950	2,270	2,310	2,450	74.8	15,710	15,400
		23.6	67.7	8.7	.6	----	----	----	----	14,200						
18136	6.6	5.3	76.2	11.9	.2	2.2	75.9	.8	9.0	11,690	1,950	2,610	2,730	----	------	------
		5.7	81.5	12.8	.2	1.6	81.2	.9	3.3	12,510						
		6.5	93.5	----	.2	1.8	93.1	1.0	3.9	14,340						
18147	1.8	3.8	82.1	12.3	.1	1.2	82.3	.7	3.4	12,250	2,710+	------	------	----	------	------
		3.9	83.6	12.5	.1	1.1	83.8	.7	1.8	12,480						
		4.4	95.6	----	.1	1.2	95.9	.8	2.0	14,270						
18151	2.9	22.6	58.5	16.0	.5	4.5	71.1	1.1	6.8	12,460	2,400	2,620	2,670	73.4	15,630	15,080
		23.2	60.3	16.5	.5	4.4	73.3	1.2	4.1	12,830						
		27.8	72.2	----	.7	5.2	87.7	1.4	5.0	15,360						
18144	10.3	24.8	46.3	18.6	.3	4.7	56.7	1.6	18.1	9,670	2,450	2,700	2,750+	----	------	------
		27.6	51.7	20.7	.3	4.0	63.2	1.8	10.0	10,780						
		34.8	65.2	----	.4	5.0	79.7	2.3	12.6	13,600						
85511	5.2	39.7	47.3	7.8	.3	----	----	----	----	12,450	2,150	2,200	2,240	54.8	14,420	13,600
		41.9	49.8	8.3	.3	----	----	----	----	13,120						
85512	4.8	39.6	47.8	7.8	.3	----	----	----	----	12,500	2,130	2,200	2,240	55.1	14,420	13,660
		41.6	50.2	8.2	.3	----	----	----	----	13,140						
85513	4.6	40.6	49.0	5.8	.3	----	----	----	----	12,790	2,130	2,200	2,280	55.0	14,360	13,650
		42.5	51.4	6.1	.3	----	----	----	----	13,410						
85514	4.9	40.1	47.8	7.2	.3	5.6	70.7	1.3	14.9	12,590	------	------	------	54.7	14,430	13,660
		42.1	50.3	7.6	.3	5.3	74.3	1.4	11.1	13,230						
		45.6	54.4	----	.3	5.7	80.3	1.5	12.2	14,310						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[7] Natural.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Moose Creek (Station)—Con.								
Buffalo	No. 1	Hvbb		M	1 2 3	Cp	98	B98926
Do	No. 2	Hvbb		M	1 2 3	Cp		B98928
Do	do	Hvbb		M	1 2 3	Cp		B98927
Do	No. 3	Hvbb		M	1 2 3	Cp		B98929
Do	No. 4	Hvbb		M	1 2 3	Cp		B98931
Do	No. 5	Hvbb		M	1 2 3	Cp		B98933
Do	do	Hvbb		M	1 2 3	Cp		B98932
Do	No. 6	Hvbb		M	1 2 3	Af		B98935
Do	No. 7 (upper bench)	Hvbb		M	1 2 3	Af		B98937
Do	No. 7 (lower bench)	Hvbb		M	1 2 3	Cp		B98936
Do			Run-of-mine	D	1 2		110	97
Do			do	D 2	1 2			98
Do			do	D 8	1 2			99
Do			Nut and steam	D	1 2			100
Do			do	D	1 2			101
Dougherty			Nut (washed)	D	1 2		110	102
Do			Steam (washed)	D	1 2			103
Howard & Jesson (LeRoy).	No. 3	Hvbb		M	1 2 3		99	A1963
Do	No. 4	Hvbb		M	1 2 3			A1964
Do	No. 5	Hvbb		M	1 2 3			A1965
New Black Diamond (Rawson)	No. 3			M	1 2		99	82919
Do	do			M	1 2			82920

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis [1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
B98926	5.1	36.7	45.9	12.3	9.5	5.2	65.5	1.3	15.2	11,670	2,720	2,800	2,910+	56.3	14,320	13,470
		38.7	48.3	13.0	.5	4.9	69.0	1.3	11.3	12,300						
		44.4	55.6	----	.5	5.6	79.4	1.5	13.0	14,140						
B98928	3.9	40.0	49.7	6.4	.2	5.6	72.2	1.3	14.3	12,920	2,520	2,660	2,860	55.8	14,490	13,880
		41.6	51.8	6.6	.3	5.4	75.2	1.3	11.2	13,440						
		44.5	55.5	----	.3	5.8	80.5	1.4	12.0	14,390						
B98927	4.7	39.8	48.8	6.7	.4	5.6	70.9	1.2	15.2	12,670	2,730	2,800	2,910+	55.4	14,400	13,670
		41.8	51.1	7.1	.4	5.3	74.3	1.3	11.6	13,280						
		44.9	55.1	----	.4	5.8	80.0	1.4	12.4	14,290						
B98929	4.6	40.0	51.0	4.4	.4	5.7	73.0	1.2	15.3	13,070	2,640	2,710	2,880	56.3	14,430	13,730
		41.9	53.5	4.6	.4	5.5	76.6	1.3	11.6	13,700						
		44.0	56.0	----	.4	5.7	80.3	1.4	12.2	14,370						
B98931	4.8	39.0	50.6	5.6	.3	5.6	71.9	1.1	15.5	12,860	2,310	2,340	2,660	56.9	14,440	13,700
		41.0	53.2	5.8	.3	5.3	75.5	1.1	12.0	13,510						
		43.5	56.5	----	.4	5.7	80.2	1.2	12.5	14,340						
B98933	4.2	38.6	49.9	7.3	.3	5.5	71.0	1.2	14.7	12,690	2,720	2,780	2,880	56.9	14,440	13,780
		40.2	52.2	7.6	.3	5.3	74.1	1.2	11.5	13,240						
		43.5	56.5	----	.3	5.7	80.2	1.3	12.5	14,320						
B98932	4.3	37.0	44.8	13.9	.3	5.2	64.7	1.0	14.9	11,540	2,710	2,780	2,880	55.6	14,310	13,590
		38.7	46.7	14.6	.3	4.9	67.6	1.1	11.5	12,060						
		45.3	54.7	----	.3	5.8	79.1	1.3	13.5	14,120						
B98935	3.9	30.7	31.4	34.0	.3	4.2	47.3	.9	13.3	8,420	2,860	2,910+	-------	53.0	14,200	13,320
		31.9	32.7	35.4	.3	3.9	49.3	.9	10.2	8,770						
		49.4	50.6	----	.5	6.1	76.2	1.4	15.8	13,560						
B98937	3.2	34.0	35.6	27.2	.2	4.7	54.2	1.1	12.6	9,760	2,910+	-------	-------	52.9	14,490	13,830
		35.1	36.8	28.1	.3	4.5	56.0	1.1	10.0	10,080						
		48.9	51.1	----	.4	6.2	77.9	1.6	13.9	14,020						
B98936	3.8	39.9	43.9	12.4	.3	5.5	66.4	1.3	14.1	11,940	2,910+	-------	-------	53.1	14,430	13,800
		41.5	45.6	12.9	.3	5.3	69.1	1.3	11.1	12,410						
		47.7	52.3	----	.4	6.0	79.3	1.5	12.8	14,260						
97	5.5	40.1	45.8	8.6	.4	----	----	----	----	12,200	-------	-------	-------	----	------	------
		42.4	48.5	9.1	.4	----	----	----	----	12,910						
98	6.0	38.3	40.8	14.9	.4	----	----	----	----	11,180	-------	-------	-------	----	------	------
		40.7	43.4	15.9	.4	----	----	----	----	11,890						
99	5.7	38.9	42.2	13.2	.3	----	----	----	----	11,420	-------	-------	-------	----	------	------
		41.2	44.8	14.0	.3	----	----	----	----	12,110						
100	4.7	39.5	44.1	11.7	.6	----	----	----	----	11,830	-------	-------	-------	----	------	------
		41.4	46.3	12.3	.6	----	----	----	----	12,410						
101	4.8	41.5	44.8	8.9	.4	----	----	----	----	11,890	-------	-------	-------	----	------	------
		43.6	47.0	9.4	.4	----	----	----	----	12,490						
102	4.3	34.1	41.8	19.8	.5	----	----	----	----	10,780	-------	-------	-------	----	------	------
		35.6	43.7	20.7	.5	----	----	----	----	11,260						
103	7.1	31.6	41.0	20.3	.5	----	----	----	----	10,460	-------	-------	-------	----	------	------
		34.1	44.1	21.8	.5	----	----	----	----	11,260						
A1963	5.5	39.4	45.6	9.5	.2	5.6	67.6	1.0	16.1	11,960	2,450	2,510	2,530	54.2	14,200	13,330
		41.7	48.3	10.0	.2	5.3	71.5	1.1	11.9	12,660						
		46.4	53.6	----	.3	5.9	79.5	1.2	13.1	14,070						
A1964	5.3	38.0	41.7	15.0	.2	5.2	62.4	.9	16.3	10,930	2,560	2,580	2,590	53.2	13,930	13,050
		40.1	44.1	15.8	.2	4.8	65.9	1.0	12.3	11,540						
		47.6	52.4	----	.3	5.7	78.2	1.2	14.6	13,710						
A1965	5.8	35.8	39.4	19.0	1.0	5.1	59.4	1.0	14.5	10,590	2,340	2,510	2,530	53.6	14,410	13,350
		38.0	41.9	20.1	1.1	4.7	63.1	1.0	10.0	11,240						
		47.5	52.5	----	1.4	5.9	79.0	1.3	12.4	14,070						
82919	7.6	37.6	46.7	8.1	.4	----	----	----	----	11,970	2,390	2,450	2,510	----	------	------
		40.7	50.6	8.7	.5	----	----	----	----	12,960						
82920	8.6	37.5	46.3	7.6	.4	----	----	----	----	11,870	2,340	2,390	2,450	----	------	------
		41.0	50.6	8.4	.4	----	----	----	----	12,980						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Matanuska field—Continued								
Moose Creek (Station)—Con.								
New Black Diamond (Rawson).	No. 3		Composite of 82919 and 82920.	M	1 2 3		99	82921
Do	do		Run-of-mine	D **14**	1 2		110	104
Do	do		Lump	D	1 2			105
Do	do		Nut (washed)	D **14**	1 2			106
Do	do		Nut	D **14**	1 2			107
Do	do		do	D **2**	1 2			108
Do	do		Steam	D **37**	1 2			109
Do	do		do	D **5**	1 2			110
Do	do		do	D	1 2			111
Premier	No. 2	Hvbb		M	1 2 3		100	A1962
Do	do	Hvbb	Run-of-mine	D	1 2		110	112
Do	do	Hvbb	do	D **3**	1 2			113
Do	do	Hvbb	Lump	D **2**	1 2			114
Do	do	Hvbb	Lump nut	D **6**	1 2			115
Do	do	Hvbb	Nut	D **2**	1 2			116
Do	do	Hvbb	Nut and steam	D	1 2			117
Do	do	Hvbb	Locomotive	D **5**	1 2			118
Do	do	Hvbb	Steam	D	1 2			119
Do	do	Hvbb	do	D	1 2			120
Prospect				M	1 2 3	NAa	100	[6]C31928
Do		Hvcb		M	1 2 3	Af		C31929
Do		Hvcb		M	1 2 3	NAa		[6]C31930
Young Creek:								
Outcrop				M	1 2		100	2223
Do				M	1 2 3			11382

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis[1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, °F.	Softening temperature, °F.	Fluid temperature, °F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
82921	8.2	37.5	46.4	7.9	0.4	5.7	67.2	1.1	17.7	11,910	------	------	------	----	------	------
		40.9	50.5	8.6	.5	5.2	73.3	1.2	11.2	12,970						
		44.8	55.2	----	.5	5.7	80.1	1.3	12.4	14,200						
104	5.7	39.5	43.2	11.6	.3	----	----	----	----	11,500	------	------	------	----	------	------
		41.9	45.8	12.3	.3	----	----	----	----	12,190						
105	3.7	40.3	32.6	23.4	.3	----	----	----	----	10,030	------	------	------	----	------	------
		41.8	33.9	24.3	.3	----	----	----	----	10,410						
106	4.2	41.6	43.4	10.8	.2	----	----	----	----	11,960	------	------	------	----	------	------
		43.4	45.3	11.3	.2	----	----	----	----	12,480						
107	5.3	40.7	43.2	10.8	.2	----	----	----	----	11,780	------	------	------	----	------	------
		43.0	45.6	11.4	.2	----	----	----	----	12,440						
108	5.2	41.4	43.5	9.9	.2	----	----	----	----	11,970	------	------	------	----	------	------
		43.7	45.9	10.4	.2	----	----	----	----	12,630						
109	6.2	39.5	42.9	11.4	.2	----	----	----	----	11,630	------	------	------	----	------	------
		42.1	45.7	12.2	.2	----	----	----	----	12,400						
110	5.7	40.4	44.1	9.8	.2	----	----	----	----	11,870	------	------	------	----	------	------
		42.8	46.8	10.4	.2	----	----	----	----	12,590						
111	5.9	39.5	37.1	17.5	.3	----	----	----	----	10,460	------	------	------	----	------	------
		42.0	39.4	18.6	.3	----	----	----	----	11,110						
A1962	5.8	38.8	49.1	6.3	.3	5.8	70.9	1.3	15.4	12,580	2,800	2,910	2,960	56.2	14,400	13,510
		41.2	52.1	6.7	.3	5.4	75.3	1.3	11.0	13,360						
		44.1	55.9	----	.3	5.8	80.6	1.4	11.9	14,310						
112	4.2	38.6	41.0	16.2	.2	----	----	----	----	11,200	------	------	------	----	------	------
		40.3	42.8	16.9	.2	----	----	----	----	11,690						
113	5.1	37.6	40.8	16.5	.3	----	----	----	----	11,090	------	------	------	----	------	------
		39.6	43.0	17.4	.3	----	----	----	----	11,690						
114	4.3	41.0	45.8	8.9	.3	----	----	----	----	12,330	------	------	------	----	------	------
		42.8	47.9	9.3	.3	----	----	----	----	12,880						
115	4.6	38.4	46.7	10.3	.3	----	----	----	----	12,130	------	------	------	----	------	------
		40.2	49.0	10.8	.3	----	----	----	----	12,720						
116	4.5	39.0	41.3	15.2	.3	----	----	----	----	11,350	------	------	------	----	------	------
		40.8	43.3	15.9	.3	----	----	----	----	11,880						
117	4.4	39.1	43.0	13.5	.3	----	----	----	----	11,720	------	------	------	----	------	------
		40.9	45.0	14.1	.3	----	----	----	----	12,260						
118	4.5	38.7	45.5	11.3	.2	----	----	----	----	11,900	------	------	------	----	------	------
		40.5	47.7	11.8	.2	----	----	----	----	12,450						
119	5.6	38.9	44.1	11.4	.4	----	----	----	----	11,600	------	------	------	----	------	------
		41.2	46.7	12.1	.4	----	----	----	----	12,280						
120	4.7	37.6	43.8	13.9	.3	----	----	----	----	11,610	------	------	------	----	------	------
		39.5	45.9	14.6	.3	----	----	----	----	12,180						
[6]C31928	12.9	33.7	43.4	10.0	.3	5.2	57.3	.9	26.3	9,690	2,620	2,760	2,880	----	------	------
		38.7	49.8	11.5	.3	4.3	65.7	1.0	17.2	11,130						
		43.7	56.3	----	.3	4.9	74.3	1.1	19.4	12,570						
C31929	5.6	34.6	43.1	16.7	.2	5.0	60.3	.9	16.9	10,560	2,910+	------	------	56.5	13,840	12,890
		36.7	45.6	17.7	.3	4.7	63.9	1.0	12.4	11,190						
		44.5	55.5	----	.3	5.7	77.7	1.2	15.1	13,600						
[6]C31930	7.4	35.8	47.4	9.4	.3	5.4	64.3	1.1	19.5	11,230	2,800	2,910+	------	57.6	13,630	12,510
		38.6	51.2	10.2	.3	4.9	69.4	1.1	14.1	12,130						
		43.0	57.0	----	.3	5.5	77.2	1.3	15.7	13,500						
2223	2.5	28.3	58.8	10.4	.6	----	----	----	----	13,090	------	------	------	----	------	------
		29.0	60.4	10.6	.6	----	----	----	----	13,430						
11382	10.6	33.8	50.5	5.1	.2	5.4	65.2	1.1	23.0	11,230	------	------	------	----	------	------
		37.8	56.5	5.7	.3	4.7	72.9	1.2	15.2	12,550						
		40.1	59.9	----	.3	5.0	77.2	1.3	16.2	13,300						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[6] Volatile matter by modified method.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
COOK INLET REGION—continued								
Susitna field								
Houston:								
Houston			Run-of-mine	D	1 2		110	121
Do			Lump	D	1 2			122
Do			Lump nut	D	1 2			123
Do			do	D **2**	1 2			124
Do			Lump nut and steam	D	1 2			125
Do			Locomotive	D **3**	1 2			126
Do			do	D **4**	1 2			127
Do			do	D **2**	1 2			128
Do			Steam	D	1 2			129
ALASKA GULF REGION								
Bering River field								
Barrett Creek: Cunningham claim outcrop.		Lvb		M	1 2 3		101	12716
Do		Lvb		M	1 2 3			12709
Do		Lvb		M	1 2 3			12707
Do		Lvb		M	1 2 3			12708
Do		Lvb		M	1 2 3			12714
Do		Lvb		M	1 2 3			12710
Do		Lvb		M	1 2 3			12718
Do		Lvb		M	1 2 3			12712
Do		Lvb		M	1 2 3			12711
Bering Lake: Tunnel		Lvb		M	1 2 3		101	4427

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, ° F.	Fusibility of ash: Softening temperature, ° F.	Fusibility of ash: Fluid temperature, ° F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B. t. u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
121	13.9	35.0	34.2	16.9	0.1	----	----	----	----	8,880	-------	-------	-------	----	------	------
		40.7	39.7	19.6	.1	----	----	----	----	10,310						
122	18.7	33.6	34.3	13.4	.2	----	----	----	----	8,260	-------	-------	-------	----	------	------
		41.3	42.2	16.5	.2	----	----	----	----	10,150						
123	16.7	37.8	31.2	14.3	.2	----	----	----	----	8,600	-------	-------	-------	----	------	------
		45.4	37.4	17.2	.2	----	----	----	----	10,320						
124	16.1	39.3	30.3	14.3	.2	----	----	----	----	9,000	-------	-------	-------	----	------	------
		46.8	36.2	17.0	.2	----	----	----	----	10,730						
125	18.5	39.9	27.6	14.0	.2	----	----	----	----	8,570	-------	-------	-------	----	------	------
		48.9	33.9	17.2	.2	----	----	----	----	10,520						
126	15.5	37.9	32.2	14.4	.1	----	----	----	----	9,070	-------	-------	-------	----	------	------
		44.9	38.0	17.1	.1	----	----	----	----	10,730						
127	17.1	33.9	34.2	14.8	.2	----	----	----	----	8,550	-------	-------	-------	----	------	------
		40.9	41.3	17.8	.2	----	----	----	----	10,310						
128	17.8	40.7	27.4	14.1	.2	----	----	----	----	8,520	-------	-------	-------	----	------	------
		49.5	33.3	17.2	.2	----	----	----	----	10,370						
129	18.5	39.9	27.6	14.0	.2	----	----	----	----	8,570	-------	-------	-------	----	------	------
		48.9	33.9	17.2	.2	----	----	----	----	10,520						
12716	3.6	15.4	73.9	7.1	1.2	3.8	77.9	1.6	8.4	13,120	-------	-------	-------	83.7	14,830	14,250
		16.0	76.7	7.3	1.2	3.6	80.8	1.7	5.4	13,610						
		17.2	82.8	----	1.3	3.9	87.2	1.8	5.8	14,690						
12709	2.1	14.1	72.5	11.3	1.0	3.8	77.6	1.4	4.9	13,240	-------	-------	-------	84.9	15,490	15,120
		14.4	74.1	11.5	1.0	3.6	79.2	1.5	3.2	13,520						
		16.3	83.7	----	1.2	4.1	89.5	1.7	3.5	15,280						
12707	1.6	12.7	65.0	20.7	1.1	3.5	69.5	1.4	3.8	11,840	-------	-------	-------	85.9	15,620	15,300
		12.9	66.0	21.1	1.2	3.4	70.6	1.4	2.3	12,020						
		16.3	83.7	----	1.5	4.3	89.5	1.7	3.0	15,240						
12708	1.8	14.1	81.7	2.4	1.1	4.1	86.7	1.7	4.0	14,860	-------	-------	-------	85.8	15,580	15,290
		14.3	83.2	2.5	1.2	3.9	88.3	1.7	2.4	15,130						
		14.7	85.3	----	1.2	4.0	90.5	1.7	2.6	15,500						
12714	2.9	14.2	72.8	10.1	.7	3.7	76.5	1.6	7.4	12,980	-------	-------	-------	84.7	15,090	14,590
		14.7	75.0	10.3	.7	3.5	78.8	1.7	5.0	13,360						
		16.4	83.6	----	.8	3.9	87.9	1.9	5.5	14,900						
12710	1.7	10.9	29.4	58.0	.3	2.2	31.9	.9	6.7	5,500	-------	-------	-------	82.6	15,460	14,750
		11.0	30.0	59.0	.3	2.1	32.5	.9	5.2	5,590						
		26.9	73.1	----	.8	5.0	79.1	2.3	12.8	13,620						
12718	2.7	13.8	58.1	25.4	.8	3.3	61.5	1.4	7.6	10,440	-------	-------	-------	83.5	14,980	14,420
		14.2	59.7	26.1	.8	3.1	63.3	1.4	5.3	10,740						
		19.2	80.8	----	1.1	4.1	85.6	1.9	7.3	14,530						
12712	2.1	13.5	78.2	6.2	.7	4.0	82.9	1.7	4.5	14,180	-------	-------	-------	86.0	15,580	15,220
		13.8	79.9	6.3	.7	3.8	84.7	1.8	2.7	14,490						
		14.7	85.3	----	.7	4.1	90.4	1.9	2.9	15,470						
12711	1.5	12.8	76.7	9.0	1.4	3.8	81.0	1.6	3.2	13,850	-------	-------	-------	86.9	15,660	15,390
		13.0	77.9	9.1	1.4	3.7	82.2	1.7	1.9	14,060						
		14.3	85.7	----	1.5	4.0	90.4	1.8	2.3	15,470						
4427	5.1	13.9	76.0	5.0	1.2	4.5	80.7	1.4	7.2	14,070	-------	-------	-------	85.3	15,770	14,910
		14.7	80.0	5.3	1.2	4.1	85.0	1.5	2.9	14,830						
		15.5	84.5	----	1.3	4.4	89.8	1.5	3.0	15,650						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2,3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
ALASKA GULF REGION—continued								
Bering River field—Continued								
Canyon Creek: Prospect		An		M	1 2 3		101	4433
Do		An		M	1 2 3			4461
Carbon Creek: Prospect tunnel.		Lvb		M	1 2		101	2492
Carbon Mountain (east side): Prospect		An		M	1 2		101	2480
Do		An		M	1 2			2483
Do		An		M	1 2			2487
Carbon Mountain (west side): Outcrop		An		M	1 2		102	2482
Do		An		M	1 2			2496
Prospect		An		M	1 2 3		102	4459
Do		Sa		M	1 2 3			4462
Clear Creek: Outcrop		Coke[7]		M	1 2 3		102	12713
Do		Sa		M	1 2 3			12715
Do		Sa		M	1 2 3			12717
Do		Sa (?)		M	1 2 3			4430
Do		Sa (?)		M	1 2 3			4460
Prospect		Sa (?)		M	1 2 3		102	4431
Do		Sa (?)		M	1 2 3			4435
Do		Sa (?)		M	1 2 3			4451

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis [1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
4433	7.4	6.9	71.3	14.4	0.6	3.7	70.1	1.5	9.7	11,890	------	------	------	92.8	15,460	14,100
		7.4	77.1	15.5	.6	3.1	75.7	1.6	3.5	12,850						
		8.8	91.2	----	.7	3.7	89.6	1.9	4.1	15,200						
4461	7.8	7.4	75.6	9.2	.7	4.1	74.0	1.4	10.6	12,570	------	------	------	92.2	15,310	13,980
		8.0	82.0	10.0	.7	3.5	80.2	1.5	4.1	13,630						
		8.9	91.1	----	.8	3.9	89.2	1.7	4.4	15,150						
2492	4.2	13.4	78.8	3.6	1.6	----	----	----	----	------	------	------	------	85.9	------	------
		14.0	82.2	3.8	1.6	----	----	----	----	------						
2480	8.3	6.4	82.0	3.3	1.1	----	----	----	----	------	------	------	------	93.5	------	------
		6.9	89.5	3.6	1.2	----	----	----	----	------						
2483	13.9	5.0	73.9	7.2	.8	----	----	----	----	12,140	------	------	------	94.8	15,540	13,180
		5.8	85.8	8.4	1.0	----	----	----	----	14,100						
2487	7.3	6.6	75.9	10.2	1.3	----	----	----	----	------	------	------	------	----	------	------
		7.2	81.8	11.0	1.4	----	----	----	----	------						
2482	8.3	7.1	82.5	2.1	1.1	----	----	----	----	------	------	------	------	92.7	------	------
		7.8	89.9	2.3	1.2	----	----	----	----	------						
2496	5.9	6.8	81.5	5.8	.8	----	----	----	----	------	------	------	------	93.1	------	------
		7.2	86.6	6.2	.9	----	----	----	----	------						
4459	3.0	6.8	75.7	14.5	1.1	3.7	74.1	1.2	5.4	12,790	------	------	------	93.5	15,770	15,210
		7.0	78.1	14.9	1.1	3.5	76.3	1.2	3.0	13,180						
		8.3	91.7	----	1.3	4.1	89.8	1.4	3.4	15,490						
4462	7.6	9.8	76.4	6.2	.6	4.4	77.3	1.5	10.0	13,060	------	------	------	89.4	15,260	14,020
		10.6	82.6	6.8	.6	3.9	83.7	1.6	3.4	14,140						
		11.4	88.6	----	.7	4.2	89.7	1.7	3.7	15,160						
12713	1.2	10.0	84.5	4.3	1.6	3.2	86.4	1.5	3.0	14,340	------	------	------	----	------	------
		10.1	85.5	4.4	1.6	3.1	87.4	1.5	2.0	14,520						
		10.6	89.4	----	1.7	3.3	91.4	1.5	2.1	15,180						
12715	1.6	12.0	84.7	1.7	1.0	3.8	88.7	1.4	3.4	15,020	------	------	------	88.0	15,590	15,340
		12.1	86.1	1.8	1.0	3.7	90.1	1.4	2.0	15,260						
		12.4	87.6	----	1.0	3.8	91.7	1.5	2.0	15,540						
12717	1.8	13.6	80.0	4.6	1.2	3.9	84.6	1.5	4.2	14,400	------	------	------	86.2	15,490	15,200
		13.9	81.4	4.7	1.2	3.8	86.1	1.5	2.7	14,660						
		14.6	85.4	----	1.3	4.0	90.4	1.6	2.7	15,390						
4430	5.9	10.9	78.4	4.8	2.5	4.3	78.2	1.3	8.9	13,570	------	------	------	89.1	15,360	14,390
		11.5	83.4	5.1	2.7	3.9	83.1	1.4	3.8	14,420						
		12.2	87.8	----	2.8	4.1	87.6	1.5	4.0	15,200						
4460	6.6	9.2	71.5	12.7	.6	4.3	72.4	1.3	8.7	12,350	------	------	------	90.0	15,530	14,330
		9.9	76.6	13.5	.6	3.8	77.6	1.4	3.1	13,220						
		11.4	88.6	----	.7	4.4	89.7	1.6	3.6	15,290						
4431	5.7	8.7	80.9	4.7	1.2	4.3	81.5	1.3	7.0	14,190	------	------	------	91.1	15,960	14,990
		9.3	85.8	4.9	1.3	3.9	86.5	1.4	2.0	15,050						
		9.8	90.2	----	1.4	4.1	91.0	1.4	2.1	15,830						
4435	4.2	8.7	84.6	2.5	1.4	4.4	84.0	1.4	6.3	14,560	------	------	------	91.4	15,690	15,010
		9.1	88.3	2.6	1.5	4.1	87.7	1.5	2.6	15,200						
		9.3	90.7	----	1.5	4.2	90.0	1.6	2.7	15,610						
4451	3.7	13.2	77.1	6.0	3.1	4.2	80.0	1.4	5.3	13,950	------	------	------	86.9	15,660	15,030
		13.7	80.0	6.3	3.2	3.9	83.1	1.5	2.0	14,490						
		14.6	85.4	----	3.4	4.2	88.6	1.6	2.2	15,460						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.
[7] Natural.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
ALASKA GULF REGION—continued								
Bering River field—Continued								
Falls Creek:								
Christopher prospect.		Sa (?)		M	1 2		103	2488
Outcrop		Sa (?)		M	1 2 3		103	4454
Fourth Berg Lake: Outcrop.		An		M	1 2		103	2478
Katalla:								
Carbon	No. 16	Lvb	Run-of-mine	T	1 2 3		104	86751
Do	do	Lvb	2½-inch lump	T	1 2 3			86750
Do	do	Lvb	2½- by 1-inch (washed).	T	1 2 3			86745
Do	do	Lvb	2½-inch slack	T	1 2 3			86743
Do	do	Lvb	1-inch slack	T	1 2 3			86744
Do	do	Lvb	1-inch slack (washed)	T	1 2 3			86748
Shield's prospect tunnel.	No. 18	Lvb		M	1 2		104	79356
Do	do	Lvb		M	1 2			79357
Do	do	Lvb	Composite of 79356 and 79357.	M	1 2 3			79358
Kushtaka Ridge (east side):								
Outcrop		Sa		M	1 2 3		104	4455
Do		Sa		M	1 2 3			4428
Tunnel		Sa		M	1 2 3		104	4463
Leeper Creek: Outcrop.		Sa		M	1 2 3		104	4453
Mount Ann:								
Outcrop		Sa		M	1 2 3		104	12719

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No. or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, ° F.	Fusibility of ash: Softening temperature, ° F.	Fusibility of ash: Fluid temperature, ° F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
2488	6.0	13.0	78.4	2.6	0.7	----	----	----	----	------	-------	-------	-------	86.2	------	------
		13.8	83.4	2.8	.7	----	----	----	----	------						
4454	5.5	12.9	64.3	17.3	2.8	4.0	66.0	1.0	8.9	11,720	-------	-------	-------	86.0	15,590	14,510
		13.6	88.1	18.3	3.0	3.6	69.9	1.0	4.2	12,410						
		16.7	83.3	----	3.7	4.4	85.6	1.2	5.1	15,190						
2478	7.7	5.8	66.0	20.5	2.9	----	----	----	----	------	-------	-------	-------	95.7	------	------
		6.3	71.5	22.2	3.1	----	----	----	----	------						
86751	5.0	13.7	77.5	3.8	.9	4.6	82.3	1.4	7.0	14,190	2,180	2,240	2,510	85.6	15,650	14,830
		14.4	81.6	4.0	.9	4.3	86.6	1.5	2.7	14,930						
		15.0	85.0	----	.9	4.5	90.2	1.6	2.8	15,550						
86750	2.4	13.9	80.0	3.7	1.0	4.4	85.3	1.4	4.2	14,690	2,150	2,240	2,510	85.8	15,730	15,340
		14.3	81.9	3.8	1.0	4.2	87.4	1.5	2.1	15,050						
		14.9	85.1	----	1.0	4.4	90.8	1.5	2.3	15,650						
86745	2.4	13.9	80.7	3.0	.8	4.5	85.2	1.5	5.0	14,830	2,180	2,390	2,450	85.8	15,750	15,360
		14.2	82.8	3.0	.9	4.4	87.3	1.5	2.9	15,200						
		14.7	85.3	----	.9	4.5	90.0	1.6	3.0	15,680						
86743	3.3	13.1	79.1	4.5	.8	4.5	83.0	1.4	5.8	14,360	2,160	2,340	2,450	86.4	15,670	15,120
		13.5	81.9	4.6	.8	4.2	85.8	1.5	3.1	14,860						
		14.2	85.8	----	.9	4.5	90.0	1.6	3.0	15,580						
86744	5.5	13.7	77.2	3.6	.8	4.6	81.4	1.5	8.1	14,120	2,200	2,450	2,630	85.5	15,610	14,720
		14.5	81.7	3.8	.9	4.2	86.2	1.5	3.4	14,950						
		15.1	84.9	----	.9	4.4	89.6	1.6	3.5	15,540						
86748	5.8	13.3	78.8	2.1	.8	4.7	83.3	1.5	7.6	14,430	2,280	2,390	2,620	86.0	15,730	14,790
		14.1	83.7	2.2	.8	4.3	88.4	1.6	2.7	15,320						
		14.4	85.6	----	.9	4.4	90.4	1.6	2.7	15,670						
79356	2.0	14.7	79.5	3.8	.7	----	----	----	----	14,790	2,280	2,390	2,440	84.9	15,780	15,450
		15.0	81.1	3.9	.7	----	----	----	----	15,100						
79357	2.5	14.5	79.6	3.4	.7	----	----	----	----	14,840	2,130	2,390	2,680	85.1	15,840	15,430
		14.9	81.6	3.5	.7	----	----	----	----	15,220						
79358	2.2	15.0	79.1	3.7	.7	4.5	85.9	1.6	3.6	14,800	-------	-------	-------	84.6	15,810	15,440
		15.3	81.0	3.7	.7	4.4	87.8	1.6	1.8	15,140						
		15.9	84.1	----	.7	4.5	91.2	1.7	1.9	15,720						
4455	5.4	13.1	79.7	1.8	.7	4.5	83.3	1.4	8.3	14,450	-------	-------	-------	86.3	15,620	14,760
		13.9	84.2	1.9	.7	4.2	88.0	1.5	3.7	15,280						
		14.1	85.9	----	.7	4.3	89.8	1.5	3.7	15,570						
4428	9.4	13.0	74.0	3.6	.6	4.9	77.2	1.2	12.5	13,360	-------	-------	-------	85.6	15,430	13,920
		14.3	81.7	4.0	.7	4.2	85.2	1.4	4.5	14,750						
		14.9	85.1	----	4.7	4.4	88.7	1.4	4.8	15,360						
4463	2.9	10.8	71.3	15.0	4.1	3.7	70.1	1.1	6.0	12,350	-------	-------	-------	89.9	15,440	14,890
		11.0	73.5	15.5	5.3	3.5	72.2	1.1	3.4	12,720						
		13.1	86.9	----	1.1	4.1	85.4	1.3	4.1	15,040						
4453	4.0	12.5	77.4	6.1	1.1	4.3	79.9	1.3	7.3	14,170	-------	-------	-------	86.9	15,900	15,210
		13.0	80.7	6.3	1.2	4.1	83.2	1.4	3.8	14,760						
		13.9	86.1	----	.2	4.4	88.8	1.5	4.1	15,760						
12719	3.4	9.3	76.0	11.3	.5	3.0	77.9	1.0	6.3	12,710	-------	-------	-------	90.2	15,080	14,490
		9.6	78.7	11.7	.5	2.7	80.7	1.1	3.3	13,160						
		10.9	89.1	----	.6	3.0	91.4	1.2	3.8	14,900						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2] [3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
ALASKA GULF REGION—continued								
Bering River field—Continued								
Mount Ann—Con.								
Outcrop		Sa		M	1 2 3		104	12720
Do		Sa		M	1 2 3			12733
Mount Hamilton: McDonald	Unnamed	Lvb		M	1 2 3		104	12722
Do	do	Lvb		M	1 2 3			12730
Do	do	Lvb		M	1 2 3			12731
Outcrop	Unnamed (upper bench).	Lvb		M	1 2 3		104	4437
Do	do			M	1 2 3			4452
Do	Unnamed (lower bench).			M	1 2 3			4436
Nevada Creek: Prospect tunnel.	do	Sa		M	1 2		105	2491
Powers Creek: Prospect tunnel.	do	Sa		M	1 2		105	2493
Queen Creek: Outcrop		Lvb		M	1 2		105	2486
Do		Lvb		M	1 2			2495
Do		Sa		M	1 2			2494
Second Berg Lake: Outcrop.	Unnamed	An		M	1 2		106	2485
Tokun Creek: Prospect tunnel.	do	Sa		M	1 2		106	2490
Trout Creek: Cunningham prospect tunnel No. .		Lvb		M	1 2 3		106	15355
Do		Lvb		M	1 2 3			15356
Do		Lvb		M	1 2 3			15357
Do		Lvb		M	1 2 3			15358

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent: Moisture	Proximate, percent: Volatile matter	Proximate, percent: Fixed carbon	Proximate, percent: Ash	Ultimate, percent: Sulfur	Ultimate, percent: Hydrogen	Ultimate, percent: Carbon	Ultimate, percent: Nitrogen	Ultimate, percent: Oxygen	Calorific value, B. t. u.	Fusibility of ash: Initial deformation temperature, ° F.	Fusibility of ash: Softening temperature, ° F.	Fusibility of ash: Fluid temperature, ° F.	Mineral-matter-free basis[1]: Fixed carbon, dry basis, percent	Mineral-matter-free basis[1]: Calorific value: B. t. u., dry basis	Mineral-matter-free basis[1]: Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
12720	5.1	9.2	60.9	24.8	0.5	2.6	61.9	1.0	9.2	9,880	------	------	------	89.6	14,530	13,510
		9.7	64.1	26.2	.5	2.1	65.2	1.0	5.0	10,410						
		13.1	86.9	----	.7	2.9	88.4	1.4	6.6	14,110						
12733	3.7	9.2	84.5	2.6	.6	3.2	86.5	1.1	6.0	14,180	------	------	------	90.6	15,190	14,610
		9.5	87.8	2.7	.6	2.9	89.8	1.1	2.9	14,720						
		9.8	90.2	----	.6	3.0	92.2	1.2	3.0	15,120						
12722	1.0	16.7	69.3	13.0	1.3	4.0	76.4	1.4	3.9	13,460	------	------	------	82.0	15,900	15,710
		16.9	70.0	13.1	1.3	3.9	77.2	1.4	3.1	13,590						
		19.4	80.6	----	1.5	4.5	88.8	1.6	3.6	15,640						
12730	8.6	13.5	68.9	9.0	.6	4.0	66.6	1.3	18.5	11,000	------	------	------	84.6	13,480	12,200
		14.8	75.8	9.9	.6	3.3	72.8	1.4	12.0	12,040						
		16.4	83.6	----	.7	3.6	80.8	1.6	13.3	13,350						
12731	1.0	16.0	65.0	18.0	2.4	3.6	72.2	1.2	2.6	12,530	------	------	------	82.6	15,860	15,660
		16.1	65.7	18.2	2.4	3.5	73.0	1.2	1.7	12,650						
		19.7	80.3	----	2.9	4.3	89.2	1.5	2.1	15,460						
4437	7.7	15.6	67.8	8.6	.8	4.6	70.9	1.2	13.9	12,540	------	------	------	82.0	15,140	13,850
		16.9	73.5	9.6	.9	4.0	76.8	1.3	7.4	13,600						
		18.7	81.3	----	1.0	4.4	85.0	1.4	8.2	15,040						
4452	5.7	13.0	47.1	34.2	6.5	3.3	47.0	.8	8.2	8,390	------	------	------	----	------	------
		13.8	50.0	36.2	6.9	2.9	49.8	.9	3.3	8,890						
		21.7	78.3	----	10.8	4.5	78.1	1.3	5.3	13,950						
4436	6.1	11.7	51.1	31.1	5.2	3.6	51.2	1.0	7.9	9,070	------	------	------	----	------	------
		12.5	54.4	33.1	5.6	3.1	54.6	1.0	2.6	9,660						
		18.7	81.3	----	8.4	4.7	81.5	1.5	3.9	14,430						
2491	6.0	13.0	76.1	4.9	.6	----	----	----	----	------	------	------	------	86.0	------	------
		13.8	81.0	5.2	.6	----	----	----	----	------						
2493	5.8	11.7	60.3	22.2	3.4	----	----	----	----	------	------	------	------	87.5	------	------
		12.5	63.9	23.6	3.6	----	----	----	----	------						
2486	4.2	14.0	79.8	2.0	1.0	----	----	----	----	------	------	------	------	85.5	------	------
		14.6	83.3	2.1	1.0	----	----	----	----	------						
2495	5.7	13.7	76.8	3.8	.8	----	----	----	----	------	------	------	------	85.5	------	------
		14.5	81.4	4.1	.8	----	----	----	----	------						
2494	4.9	13.3	77.3	4.5	.8	----	----	----	----	------	------	------	------	86.0	------	------
		14.0	81.3	4.7	.9	----	----	----	----	------						
2485	3.7	5.4	86.0	4.9	1.1	----	----	----	----	------	------	------	------	94.9	------	------
		5.6	89.3	5.1	1.1	----	----	----	----	------						
2490	4.4	12.0	73.3	10.3	1.1	----	----	----	----	------	------	------	------	87.2	------	------
		12.5	76.7	10.8	1.2	----	----	----	----	------						
15355	1.2	17.4	78.4	3.0	.7	4.5	86.6	1.8	3.4	15,000	------	------	------	82.3	15,720	15,530
		17.6	79.3	3.1	.7	4.4	87.7	1.8	2.3	15,180						
		18.2	81.8	----	.7	4.5	90.4	1.9	2.5	15,660						
15356	1.0	16.4	72.3	10.3	.6	4.2	79.7	1.6	3.6	13,870	------	------	------	82.5	15,810	15,630
		16.6	73.0	10.4	.6	4.1	80.5	1.7	2.7	14,010						
		18.5	81.5	----	.7	4.6	89.8	1.9	3.0	15,630						
15357	2.7	16.2	76.3	4.8	.6	4.5	83.8	1.7	4.6	14,560	------	------	------	83.0	15,830	15,380
		16.7	78.4	4.9	.7	4.3	86.2	1.7	2.2	14,960						
		17.6	82.4	----	.7	4.5	90.6	1.8	2.4	15,730						
15358	1.5	16.3	76.3	5.9	.7	4.3	84.0	1.7	.34	14,510	------	------	------	83.1	15,780	15,520
		16.6	77.4	6.0	.7	4.2	85.3	1.8	2.0	14,730						
		71.6	82.4	----	.7	4.4	90.8	1.9	2.2	15,670						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

TABLE 8.—*Analyses of mine, tipple,*

Region, town or district, and mine	Bed	Rank [1]	Size or other description	Kind of sample [2 3]	Condition [4]	Agglomerating index [1]	Reference, page in this report	Laboratory No.[5] or index No.
1	2	3	4	5	6	7	8	9
ALASKA GULF REGION—continued								
Bering River field—Continued								
Trout Creek—Con. Cunningham prospect tunnel No. 5.		Lvb		M	1 2 3		106	15359
Do		Lvb		M	1 2 3			15360
Wardall Ridge: Outcrop	Unnamed			M	1 2		107	22932
Do	do			M	1 2			22933
Yakataga: Outcrop	do			M	1 2		107	19345
SOUTHEASTERN ALASKA REGION								
Admiralty Island: Harkrader		Hvbb		M	1 2 3		107	A43506
Do		Hvbb		M	1 2 3			A43507
Murder Cove: Prospect.				M	1 2		107	5796

[1] See Explanation of Symbols (p. 24).
[2] M, mine sample; T, tipple sample; D, delivered coal.
[3] The bold-faced figure indicates the number of deliveries averaged.

and delivered samples—Continued

Laboratory No.[5] or index No.	Proximate, percent				Ultimate, percent					Calorific value, B. t. u.	Fusibility of ash			Mineral-matter-free basis[1]		
	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen		Initial deformation temperature, ° F.	Softening temperature, ° F.	Fluid temperature, ° F.	Fixed carbon, dry basis, percent	Calorific value: B. t. u., dry basis	Calorific value: B.t.u., moist basis
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
15359	1.2	16.4	77.9	4.5	0.7	4.4	85.6	1.7	3.1	14,770	------	------	------	83.2	15,750	15,550
		16.6	78.9	4.5	.7	4.3	86.7	1.7	2.1	14,960						
		17.4	82.6	----	.7	4.5	90.8	1.8	2.2	15,670						
15360	1.4	16.5	78.3	3.8	.7	4.4	85.1	1.8	4.2	14,880	------	------	------	83.1	15,770	15,540
		16.7	79.5	3.8	.7	4.3	86.3	1.9	3.0	15,090						
		17.4	82.6	----	.7	4.5	89.7	1.9	3.2	15,690						
22932	5.3	17.5	70.3	6.9	.6	----	----	----	----	12,360	2,600	2,730+	------	----	------	------
		18.5	74.2	7.3	.7	----	----	----	----	13,060						
22933	3.1	15.6	80.1	1.2	.7	----	----	----	----	14,220	2,090	2,400	2,530	----	------	------
		16.1	82.6	1.3	.7	----	----	----	----	14,680						
19345	1.0	11.5	64.0	23.5	.7	----	----	----	----	------	2,730+	------	------	----	------	------
		11.6	64.7	23.7	.7	----	----	----	----	------						
A43506	3.8	35.2	39.6	21.4	1.3	5.1	58.9	1.0	12.3	10,630	2,160	2,250	2,470	54.4	14,600	13,870
		36.6	41.2	22.2	1.3	4.9	61.3	1.0	9.3	11,050						
		47.1	52.9	----	1.7	6.3	78.7	1.3	12.0	14,210						
A43507	6.4	34.3	36.3	23.0	.9	5.0	55.2	1.0	14.9	9,930	2,180	2,270	2,430	54.4	14,600	13,870
		36.7	38.7	24.6	1.0	4.6	59.0	1.1	9.7	10,610						
		48.6	51.4	----	1.3	6.0	78.2	1.4	13.1	14,070						
5796	5.7	30.3	46.9	17.1	.3	----	----	----	----	11,200	------	------	------	----	------	------
		32.1	49.8	18.1	.3	----	----	----	----	11,880						

[4] 1, Sample as received; 2, dried at 105° C.; 3, moisture- and ash-free.
[5] X preceding laboratory number indicates analysis made at Anchorage, Alaska.

DESCRIPTION OF MINE SAMPLES

Compiled by H. M. Cooper,[1] R. F. Abernethy,[2] and E. C. Tarpley[3]

The brief descriptions that follow have been compiled from notes made by the men who took the samples. They give information regarding the thickness, composition, and geology of the beds in the mine, prospect, or outcrop and, for the operating mines, the method of mining and preparation. The letters in parentheses following the sampler's name indicate the organization with which he was associated when the samples were taken, as follows: USBM, Bureau of Mines; USGS, Geological Survey; USMC, United States Marine Corps; AEC, Alaskan Engineering Commission; ADM, Alaska Department of Mines.

NORTHERN ALASKA REGION

Ikpikpuk River. Outcrops

Analysis A6849 (p. 26). Weathered coal from outcrop on west bank of Chipp River, 7 miles from its junction with lower East Fork. The bed was measured and sampled at one point, after the weathered face was cut back about 1 foot, by J. B. Mertie (USGS), August 7, 1924, as described below:

Section of outcrop on Chipp River

Laboratory No.	A6849		Laboratory No.	A6849	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale:			Floor, sandstone:		
Coal		[a] 6	Thickness of bed	3	9
Shale	[a] 2	0	Thickness of sample	1	3
Coal	1	3			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 815 (p. 312).

Analysis A6847 (p. 26). Weathered coal from outcrop opposite camp site of August 1 on Ikpikpuk River. The bed was measured and sampled at one point, after the weathered face was cut back 10 inches, by P. S. Smith (USGS), August 2, 1924, as described below:

Section of outcrop on Ikpikpuk River

Laboratory No.	A6847		Laboratory No.	A6847	
	Ft.	*in.*		*Ft.*	*in.*
Roof, sandstone:			Coal	2	1¼
Coal	2	1¼	Floor, not stated:		
Bone		⅛	Thickness of bed and sample	4	2⅝

[1] Senior chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.
[2] Chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.
[3] Associate chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.

Geologic relations are given in Geological Survey Bulletin 815 (p. 312).

KIANA. OUTCROP

Analysis A52083 (p. 26). Weathered coal from district at foot of Waring Mountains, Brooks Range; latitude 67° N., longitude 160° W. The bed was 16 to 26 inches thick. The sample was submitted by B. D. Stewart (USGS), June 10, 1929.

KILLIK RIVER. OUTCROP

Analysis A6848 (p. 26). Weathered coal from outcrop on northeast bank of Killik River, 9.8 miles south, 68° east of the junction of Killik and Colville Rivers. Thickness of bed, 2 feet; roof and floor, shale. The sample was taken after 2 feet of weathered face was cut away by J. B. Mertie (USGS), July 1, 1924.

Geologic relations are given in Geological Survey Bulletin 815 (p. 314).

KUKPOWRUK RIVER. OUTCROPS

Analysis 96820 (p. 26). Weathered coal from outcrop on Kukpowruk River, 5 miles upstream from mouth. Thickness of bed, 10 feet; roof, brown shale; floor, gray shale; dip, 30° to 50°. The bed was measured and sampled at one point by W. T. Foran (USGS), July 21, 1923.

Geologic relations are given in Geological Survey Bulletin 815 (p. 305).

Analysis 96821 (p. 26). Weathered coal from outcrop on Kukpowruk River, 25 miles upstream from mouth. Thickness of bed, 20 feet; roof, gray, sandy shale; floor, gray shale; dip, 30° to 50°. The bed was measured and sampled at one point by W. T. Foran (USGS), July 20, 1923.

Geologic relations are given in Geological Survey Bulletin 815 (p. 305).

MEADE RIVER. MEADE RIVER MINE

Analysis C27944 (p. 26). Weathered subbituminous coal, Meade River district, from Meade River mine on Meade River; latitude 70°30′ N., longitude 157°8′ W. The bed is 66 inches thick; the bottom is 2 feet above the surface of the river. The bed was measured and sampled at one point by R. S. Sanford (USBM), August 19, 1944.

The production for the following winter was estimated at 1,500 tons, which was to be used by the Office of Indian Affairs at Point Barrow.

MEADE RIVER. MEADE RIVER PROSPECT

Analysis C27945 (p. 26). Weathered subbituminous coal, Meade River district, from prospect on Meade River; latitude 70°38′ N., longitude 157°7′ W. The bed is at least 36 inches thick; the top is just above the surface of the river. The test pit was flooded, and the exact thickness of the bed could not be determined. The sample was taken by R. S. Sanford (USBM) in August 1944.

PEARD BAY. OUTCROP

Analysis C27946 (p. 26). Weathered subbituminous coal, Peard Bay district, from outcrop on east bank of Peard Bay; latitude 70°43′ N., longitude 159°00′ W. Thickness of bed, 66 inches; cover at point sampled, 12 feet. The bed was exposed 1,000 feet along the east bank of the bay and was measured and sampled by R. S. Sanford (USBM), September 4, 1944.

PEARD BAY. PROSPECT

Analysis C27948 (p. 26). Weathered subbituminous coal, Peard Bay district, Kugrua Inlet, from prospect on north bank of Kugrua River. Thickness of bed, 66 inches; thickness of sample, 30 inches. The bed is level. The sample was taken from face of old trench cut by natives by R. S. Sanford (USBM), September 7, 1944.

WAINWRIGHT. ARCTIC OCEAN BEACH

Analysis C27950 (p. 26). Weathered subbituminous coal, Wainwright district, 2 miles southwest of Wainwright; latitude 70°38′ N., longitude 159°55′ W. The coal was washed upon beach during storms. It was gathered by Eskimos, sacked, and used in Wainwright. The sample was taken by R. S. Sanford (USBM) in September 1944.

WAINWRIGHT. KUK RIVER OUTCROPS

Analyses C27949 and C27947 (p. 26). Weathered subbituminous coal, Kuk River district, from outcrop on east bank of Kuk River; latitude 70°27′ N., longitude 159°41′ W. The beds were exposed for a mile along the east bank of the Kuk River and were measured and sampled at two points by R. S. Sanford (USBM), September 4, 1944, as described below:

Section of coal beds on Kuk River

Laboratory Nos.	C27949, C27947		Laboratory Nos.	C27949, C27947	
Overburden	12	0	Coal [b]	6	0
Bone	1	6	Clay		6
Coal [a]	5	6	Surface of river.		
Clay	4	0			

[a] Sample C27949, top bed.
[b] Sample C27947, bottom bed.

Analysis 96823 (p. 26). Subbituminous B coal from outcrop on Kuk River, approximately 12 miles south of Wainwright. Thickness of bed, 12 feet; roof, carbonaceous shale; floor, bluish-gray sandy shale. The bed is level; it was measured and sampled at one point by W. T. Foran (USGS), September 1, 1923.

The natives have mined and sold several hundred tons of coal in Wainwright. The mining methods were very primitive.

Geologic relations are given in Geological Survey Bulletin 815 (p. 308).

Analysis 96822 (p. 26). Subbituminous B coal from outcrop on Kuk River, about 14 miles south of Wainwright. Thickness of bed, 12 feet; roof, carbonaceous shale; floor, bluish-gray sandy shale. The bed is level; it was measured and sampled at one point by W. T. Foran (USGS), September 1, 1923.

Geologic relations are given in Geological Survey Bulletin 815 (p. 308).

WAINWRIGHT. MINE

Analysis 26371 (p. 26). Subbituminous B coal from a mine near Wainwright Inlet. Data on sampling this mine were not available.

SEWARD PENINSULA REGION

CANDLE. KUGRUK MINE

Analysis 19928 (p. 26). Subbituminous coal, Seward Peninsula, from Kugruk mine, a drift mine 20 miles from Candle. Coal bed, unnamed; thickness of bed, 70 feet; dip, 60° E.; strike, N.-S.; cover at point sampled, 180 feet. The bed was measured and sampled at face of a stope, 450 feet from mine mouth, by William Maloney (USGS), September 9, 1914.

The annual output at the time of sampling was approximately 750 tons. Geologic relations are given in Geological Survey Bulletin 379 (p. 362).

CHICAGO CREEK. CHICAGO CREEK MINE

Analyses 6940 to 6948 (p. 26). Lignite from Chicago Creek mine on Chicago Creek, a tributary of Kugruk River; latitude 55°55′ N., longitude 162°25′ W. Thickness of bed, 88 feet (with a few thin partings of bone and sandy shale); dip, 53° W.; strike, N. 8° W. The bed was measured and sampled at nine points by F. F. Henshaw (USGS) in 1908.

Sample 6944 was taken in crosscut on lowest level, 12 feet from hanging wall; sample 6942, 12 to 24 feet from hanging wall; sample 6946, 24 to 36 feet from hanging wall; sample 6941, 36 to 48 feet from hanging wall; sample 6943, 48 to 60 feet from hanging wall; sample 6940, 60 to 72 feet from hanging wall; sample 6947, 72 to 84 feet from hanging wall; sample 6948, 84 to 96 feet from hanging wall; and sample 6945, 96 to 104 feet from hanging wall.

Geologic relations are given in Geological Survey Bulletin 379 (p. 362).

YUKON REGION

BROAD PASS FIELD

Broad Pass. Prospects

Analyses C31318 to C31322 (p. 28). Lignite and weathered lignite, Broad Pass district, from prospects near Broad Pass in T. 19 S., R. 9 W. The bed dips 0° to 15°; it was measured and sampled at five points by James Hulbert (USBM), September 6 to 9, 1944, as described below:

Sections of lignite bed in prospects near Broad Pass

Section Laboratory No.	A C31318		B C31319		C C31320		D C31321		E C31322	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, clay and gravel:										
Bone		[a] 7				[a] 7				
Lignite	2	0			1	3			8	8
Lignite and bone			2	8						
Lignite, weathered							2	4		
Clay						[a] 5				
Bone	[a] 1	3		[a] 10	[a] 1	8				
Clay and bone		[a] 5		[a] 4				6		
Lignite	2	5				7	3	1		
Bone				[a] 2	[a] 1	0				
Lignite, dirty								[a] 3		
Lignite			2	4	1	0				
Clay						[a] 4				
Lignite					2	6				
Floor, not stated:										
Thickness of bed	6	8	6	4	9	4	6	2	8	8
Thickness of sample	4	5	5	0	5	4	5	11	8	8

[a] Not included in sample.

Samples C31318, C31320, and C31321 were trench samples 1, 3, and 10, respectively; sample C31322 was a prospect sample; and sample C31319 was an entry sample from Archie Lewis tunnel.

Charley Creek. Prospect

Analysis 5794 (p. 28). Coal from Jim Henderson claim at Charley Creek, near Copper Creek, Yukon River. Coal bed, No. 2.

Chicken. Prospect

Analyses A47661 and A47662 (p. 28). Subbituminous C coal from a 35-foot prospect shaft ¼ mile west of Chicken, Fortymile district. Coal bed, unnamed; thickness, 22 feet; dip, 90°; strike, N. 65° E.; roof and floor, not exposed. The bed was measured and sampled at two points by J. B. Mertie (USGS), August 23, 1928. Sample A47661 represented the entire bed and was taken 60 feet from shaft bottom. Sample A47662 represented a narrow band of bright coal.

Geologic relations are given in Geological Survey Bulletin 813 (p. 141).

Colorado Station. Costello Creek Mine

Analyses C1804 to C1807 (p. 28). Subbituminous A and B coals, Broad Pass field, from Costello Creek mine, 12 miles northwest of Colorado Station. Coal beds, Stevens, Billie, and Dunkle; dip, 3° to 10°; strike, variable. The beds were measured and sampled at four points by C. R. Garrett (USBM), April 24 and 28, 1943, as described below:

Sections of Dunkle coal bed in Costello Creek mine

Section	A		B	
Laboratory No.	C1804		C1806	
	Ft.	*in.*	*Ft.*	*in.*
Roof, sandy shale:				
Shale, carbonaceous		[a] 2		[a] 5
Coal		10	1	11
Shale		½		
Coal, bony				[a] 3
Coal		9½		
Coal, blocky			2	8
Shale		[a] 5		
Coal, shattered	2	9		3
Coal			2	6
Bone		[a] 2		
Coal, shattered	1	0		
Floor, shale, carbonaceous:				
Thickness of bed	6	2	8	0
Thickness of sample	5	5	7	4

[a] Not included in sample.

Sample C1804 was taken at face of haulageway, 450 feet from No. 2 portal; cover, 80 feet. Sample C1806 was taken from face of 1 room, 120 feet from haulageway, 40 feet from No. 2 portal; cover, 50 feet.

Section of Stevens coal bed in Costello Creek mine

Laboratory No.	C1805	
	Ft.	*in.*
Roof, sandy shale:		
Coal, blocky	2	3¼
Shale		¾
Coal, blocky	3	10
Coal, shale		[a] 5
Floor, shale:		
Thickness of bed	6	7
Thickness of sample	6	2

[a] Not included in sample.

Sample C1805 was taken from haulageway, 30 feet from face in 2 north room, 140 feet from No. 1 portal; cover, 55 feet.

Section of Billie coal bed in Costello Creek mine

Laboratory No.	C1807	
	Ft.	*in.*
Roof, shale:		
Coal	2	1
Shale		[a] 2
Coal	2	9
Floor, sandy shale:		
Thickness of bed	5	0
Thickness of sample	4	10

[a] Not included in sample.

Sample C1807 was taken in raise, 5 feet above hanging wall of Stevens bed, 40 feet from No. 1 portal; cover, 45 feet.

System of mining, room-and-pillar. The coal was shot down with explosives and shipped as run-of-mine. In 1942, 3,000 tons from the Dunkle bed was hauled by truck 12 miles to the railroad.

Colorado Station. Dunkle-Camp Creek Mine

Analysis B67785 (p. 30). Subbituminous B coal, Broad Pass field, from Dunkle-Camp Creek mine, near Colorado Station. Coal bed, No. 8; thickness, 8 feet; dip, 4°; cover, 150 feet. The bed was measured and sampled at last crosscut on L., 125 feet from portal, by M. L. Sharp (USBM) in 1941.

Eagle. Prospect

Analysis 5795 (p. 30). Lignite from prospect at Williams Creek, 6 miles from Eagle, on Yukon River. Coal bed, No. 3.

Geologic relations are given in Geological Survey Bulletin 218 (pp. 55–58).

GALENA. OUTCROP

Analysis C36293 (p. 30). Weathered subbituminous coal, Nulato district, from outcrop on north bank of Yukon River, 20 miles above Galena. The sample was taken by R. M. Chapman (USGS) in 1944.

IDITAROD. PROSPECT

Analysis 19347 (p. 30). Anthracite, Iditarod district, from prospect near Iditarod Flat tramway. Thickness of bed, 15 to 30 inches; roof and floor, shale. The sample was taken by Charles Estmere (USGS) in 1914.

INNOKO DISTRICT. PROSPECTS

Analysis 26370 (p. 30). Anthracite from prospect, near tramway between Iditarod and Flat, Innoko district.

Analysis A16716 (p. 30). Coal, Innoko district, from prospect in gulch on northwest side of Innoko River, 6 miles above its confluence with Shageluk Slough. The sample was taken by Harry Buhro (USGS), October 21, 1925.

Geologic relations are given in Geological Survey Bulletin 410 (pp. 56–57).

KALTAG. ADOLPH MULLER PROSPECT

Analysis A15869 (p. 30). Coal, Kaltag district, from Adolph Muller prospect, 8 miles below Kaltag on the Yukon River. The bed was 54 inches thick. It was measured and sampled at one point by M. L. Sharp (USBM), September 18, 1925.

KALTAG. PROSPECT

Analysis C36295 (p. 30). Weathered bituminous coal, Innoko district, from prospect on west bank of Yukon River, 70 miles below Kaltag. The sample was taken by R. M. Chapman (USGS) in 1944.

MOUNT MCKINLEY NATIONAL PARK. ALASKA ROAD COMMISSION MINE

Analysis B16186 (p. 30). Subbituminous B coal, Mount McKinley National Park district, from Alaska Road Commission mine near the 42-mile post of the Mount McKinley National Park Highway, on Coal Creek, a tributary of the east fork of Toklat River. The sample represented 6 feet of the lower bench of a bed of undetermined thickness. It was taken from face of gangway by B. D. Stewart, Commissioner of Mines, July 30, 1936.

MOUNT MCKINLEY NATIONAL PARK DISTRICT. PROSPECT

Analysis 87352 (p. 30). Subbituminous coal, Mount McKinley National Park district (Kantishna), from prospect on west fork of Stony Creek, a tributary of Toklat River. The sample was taken from a 2-ton lot by J. A. Davis (USBM), October 2, 1922. The bed was reported to be at least 30 feet thick.

Geologic relations are given in Geological Survey Bulletin 687 (p. 112).

MOUNT MCKINLEY PARK STATION. PROSPECT

Analysis 94109 (p. 30). High-volatile A bituminous coal, Mount McKinley National Park district, from prospect 6 miles from the 347-mile post on the Alaska Railroad. The sample was taken by A. Anderson (USGS) in 1923.

YANERT. YANERT MINE

Analyses 94166 to 94169 (p. 30). Medium-volatile bituminous and weathered coals, Mount McKinley National Park district, from Yanert mine, 1 mile from Yanert siding. The bed was sampled at three points by J. A. Davis (USBM), August 18, 1923.

Sample 94166 (weathered) was a grab sample taken in upper counter. Sample 94167 was taken at breast of main tunnel, 420 feet from portal; and sample 94168, at breast of counter, 380 feet from portal.

The ultimate analysis of a composite made by combining samples 94167 and 94168 is given under laboratory No. 94169.

NENANA FIELD

California Creek. Outcrops

Analysis 26359 (p. 32). Lignite, Nenana field, California Creek district, from outcrop in bluff on east bank of California Creek, near southeast corner of SW¼SW¼ sec. 15, T. 9 S., R. 6 W. The bed was 10 feet 6 inches thick. The sample was taken from the top 6 feet 6 inches of bed by G. C. Martin (USGS), July 3, 1916.

Much baked clay, probably from burning of large beds, was noted at an altitude of approximately 1,650 feet in NE¼NW¼; at an altitude of 1,400 feet near the center of NE¼; at 1,575 feet on both sides of the stream that enters California Creek from the southeast in SE¼; and at 1,900 feet near the northwest corner of the section.

Geologic relations are given in Geological Survey Bulletin 664 (p. 19).

Analyses 26360 and 26361 (p. 32). Weathered lignite, Nenana field, California Creek district, from outcrop in a cliff on east side of California Creek in SW¼NE¼ sec. 27, T. 10 S., R. 6 W. The bed was measured and sampled at one point by G. C. Martin (USGS), July 16, 1916. Sample 26360 was 6 feet 6 inches thick and was separated by 8 inches of clay from sample 26361, which was 12 feet thick.

Geologic relations are given in Geological Survey Bulletin 664 (p. 23).

Healy Creek. Outcrops

Analysis 26368 (p. 32). Weathered subbituminous coal, Nenana field, Healy Creek district, from outcrop in cliff on north bank of Healy Creek, 1 mile above creek mouth. The bed was measured and sampled at top of 12-foot bed by G. C. Martin (USGS), August 19, 1916. The sample contained 6 feet of coal.

Analysis 17794 (p. 32). Lignite (weathered), Nenana field, Healy Creek district, from outcrop on Igloo Creek, about ¼ mile above junction with Healy Creek and 6 miles above junction of Healy Creek with Nenana River. Thickness of bed, 8 feet; dip, 40° to 50°; strike, SW. The lignite is massive, showing slight shaly characteristics. The sample was taken by J. A. Holmes (USGS), October 3, 1913.

Geologic relations are given in Geological Survey Bulletin 501 (p. 57).

Analysis 17795 (p. 32). Lignite (weathered), Nenana field, Healy Creek district, from outcrop on left bank of Igloo Creek, about ¼ mile above junction with Healy Creek and 6 miles above junction of Healy Creek with Nenana River. Thickness of bed, 12 to 15 feet; dip, 40° to 45°; strike, SW. The bed was measured and sampled about 400 feet below point where sample 17794 was taken by J. A. Holmes (USGS), August 26, 1913.

Geologic relations are given in Geological Survey Bulletin 501 (p. 57).

Analysis 17796 (p. 32). Lignite (weathered), Nenana field, Healy Creek district, from outcrop on left side of Healy Creek, ¼ mile above junction with Igloo Creek. Thickness of bed, 8 feet; dip, 35° NW. The bed was measured and sampled at one point by J. A. Holmes (USGS), August 26, 1913. The sample represented only 2 feet of top of bed.

Geologic relations are given in Geological Survey Bulletin 501 (p. 57).

Healy Fork. Outcrops

Analyses C30893 and C30894 (p. 32). Weathered subbituminous coal, Nenana field, from outcrop on west bank of Cripple Creek, 8 miles east of Healy Fork in sec. 16, T. 12 S., R. 6 W., 1,840 feet above sea level. Coal bed, No. 6 (?); thickness, 18 feet 4 inches; dip, 40° N.; strike, N. 70° E.; roof, sandstone; floor, clay. The bed was separated into two benches by a 1-inch parting 6 feet 3 inches from top. Sample C30893 represented the lower bench and was 12 feet thick. Sample C30894 represented the top bench and was 6 feet 4 inches thick. The bed was measured and sampled by Clyde Wahrhaftig (USGS), Milton Marsing (USGS), and Jacob Friedman (USGS), August 29, 1944.

Analyses C30892 and C30895 (p. 32). Weathered subbituminous coal, Nenana field, from outcrop on west bank of Cripple Creek, 8½ miles east of Healy Fork in sec. 15, T. 12 S., R. 6 W., 1,900 feet above sea level. Coal bed, No. 3 (?); dip, 35° N.; strike, N. 70° E. Thickness of bed, 12 feet 4 inches; roof, sandstone; floor, clay. The bed was separated into two benches by a 1-inch parting 6 feet 6 inches from top. Sample C30892 represented the bottom bench and was 5 feet 10 inches thick. Sample C30895 represented the top bench and was 6 feet 6 inches thick. The bed was measured and sampled by Clyde Wahrhaftig (USGS), Milton Marsing (USGS), and Jacob Friedman (USGS), August 29, 1944.

Healy Fork. Roth Property Outcrops

Analyses X10030 to X10036 (p. 32). Subbituminous B and C coals, Nenana field, from outcrops on Roth property, 12 miles east of Healy Fork and 8 miles east of Suntrana on Healy River, near Coal Creek, in secs. 10, 11, and 12, T. 12 S., R. 6 W. The beds were measured and sampled by H. Marstrander (USBM) and C. R. Garrett (ADM), August 7, 1944, as described below.

Sample X10030 was taken 6 feet above water level from south bank of Healy River, 1,000 feet west of Coal Creek; thickness of bed, 10 feet. Sample X10031 was taken 16 feet above water level from a vertical bed on south bank of Healy River, 500 feet southeast of Mammoth bed; thickness of bed, 36 feet. Samples X10032 and X10035 were taken from a 55-foot (Moose) bed on south bank of Healy River, ½ mile east of Mammoth bed; they included 28 feet of bed. Sample X10033 was taken 2 feet above water level from a 22-foot vertical bed 300 feet southeast of Mammoth bed. Sample X10034 was taken from Mammoth bed, 1 mile east of Coal Creek, north bank of Healy River; it included 16 feet from the middle of a 36-foot bed. Sample X10036 was taken from a 22-foot bed, 250 feet northeast of Mammoth bed, north bank of Healy River; it included 20 feet of bed.

Healy Fork. Roth-Taylor Mine

Analysis A11088 (p. 32). Subbituminous coal, Nenana field, from Roth-Taylor mine, 12 miles north of Healy Fork. Coal bed, Mammoth; thickness, 52 feet. The sample was taken from a car by M. L. Sharp (USBM), March 4, 1925.

Lignite Creek. Calderhead Mine

Analysis 34587 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, Government Reserve, from Calderhead mine. The bed was measured and sampled at one point by J. A. Davis (USGS), May 1920.

Lignite Creek. Outcrops

Analysis 26362 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop in bluff on north side of Lignite Creek in SE¼SW¼SW¼ sec. 30, T. 11 S., R. 6 W., at an altitude of 1,650 feet. Coal bed, "B"; thickness of bed, 27 feet 6 inches; thickness of sample, 26 feet. Two clay partings 6 and 12 inches thick were excluded from sample. The bed was measured and sampled by G. C. Martin (USGS), August 16, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 34).

Analysis 26363 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop on west side of fault gulch in NW¼SE¼ sec. 26, T. 11 S., R. 6 W. Thickness of bed and sample, 16 feet; dip, 26° N.; strike, N. 80° W. The bed was measured and sampled at one point by G. C. Martin (USGS), August 11, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 30).

Analysis 26364 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop in gulch emptying into Lignite Creek from north, ¼ mile northeast of southwest corner of sec. 26, T. 11 S., R. 6 W. Thickness of bed and sample, 12 feet. The bed was measured and sampled at one point by G. C. Martin (USGS), August 12, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 31).

Analysis 26365 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop on south bank of Lignite Creek near forks, 800 feet north of southeast corner of sec. 26, T. 11 S., R. 6 W. Thickness of bed and sample, 10 feet; dip, 30° SW.; strike, N. 60° W. The bed was measured and sampled by G. C. Martin (USGS), August 12, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 29).

Analysis 26366 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop in tributary of Lignite Creek in NW¼SE¼NW¼ sec. 27, at an altitude of 1,960 feet. Thickness of bed, 25 feet; dip, 20° N.; strike, N. 78° E. The coal was in a faulted zone. The bed was measured and sampled at one point by G. C. Martin (USGS), August 8, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 32).

Analysis 26367 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from an outcrop on north bank of Lignite Creek, 1 mile above mouth in NE¼NW¼ sec. 5, T. 12 S., R. 7 W. Thickness of bed, 15 feet; thickness of sample, 7 feet (lower part of bed); dip, 12° S.; strike, N. 105° E. The bed was measured and sampled by G. C. Martin (USGS), August 18, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 47).

Analysis 26369 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop in bluff on north side of creek in NW¼NW¼ sec. 35, T. 11 S., R. 7 W. The bed was measured and sampled at one point by G. C. Martin (USGS), August 20, 1916, as described below:

Section of lignite bed in Lignite Creek outcrop

Laboratory No.	26369		Laboratory No.	26369	
	Ft.	*in.*		*Ft.*	*in.*
Roof, not stated:			Coal	11	0
Coal	12	0	Floor, not stated:		
Clay		[a] 6	Thickness of bed	30	0
Coal	6	0	Thickness of sample	29	0
Clay		[a] 6			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 664 (p. 43).

Analyses 26588 and 26589 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop on north side of Lignite Creek, 6 miles above junction with Nenana River. Coal beds No. 1 and No. 5; dip, 6°; roof, sandstone; floor, clay; height above sea level, 2,000 feet. Sample 26588 represented 8 feet of a 30-foot (No. 5) bed of uniform structure. Sample 26589 represented 8 feet of coal from a bed (No. 1) 45 to 50 feet thick. The beds were measured and sampled by G. W. Evans (USGS), September 15, 1916.

Geologic relations are given in Geological Survey Bulletin 664 (p. 8).

Nenana River. Outcrop

Analysis 23042 (p. 34). Lignite (weathered), Nenana field, Lignite Creek district, from outcrop on west bank of Nenana River, 1½ miles below junction with Lignite Creek. Roof, cemented gravel; floor, sandstone; dip, 15° NW. The sample was taken from the upper part of a 5-foot bed by Thomas Riggs, Jr. (AEC), September 4, 1915.

Geologic relations are given in Geological Survey Bulletin 501 (p. 54).

Nulato. Prospect

Analysis C36294 (p. 34). Weathered bituminous coal, Nulato district, from prospect on west bank of Yukon River, 10 miles below Nulato. The sample was taken by R. M. Chapman (USGS) in 1944.

Suntrana. New Suntrana (Hill) and Old Suntrana Mines

Analyses C9524 to C9530 (p. 34). Subbituminous B and C coals, Nenana field, from New and Old Suntrana mines at Suntrana, T. 12 S., R. 7 W. Coal beds, "E," "C," "B," "F," "D," No. 4, and No. 6; dip, 26° to 37°; strike, N. 70° E. Each bed was sampled at one point by H. J. Marstrander (USBM), October 3, 1943, as described below:

Section of "E" bed in New Suntrana (Hill) mine

Laboratory No.	C9524	
	Ft.	*in.*
Roof, sandstone:		
Clay, dark	[a]1	2
Coal, hard, bright	5	6
Clay		[a]6½
Coal, dirty		[a]11½
Coal, clayey	[a]1	5
Coal	1	9
Floor, clay:		
Thickness of bed	11	4
Thickness of sample	5	6

[a] Not included in sample.

Sample C9524 was taken where new tunnel intersected bed; cover, 225 feet.

Section of "C" bed in New Suntrana (Hill) mine

Laboratory No.	C9525	
	Ft.	*in.*
Roof, arkose, fine:		
Coal, solid, blocky	16	9
Shale, carbonaceous		2
Coal, solid	1	2½
Parting		½
Coal, solid	4	1½
Parting		7
Floor, shale, carbonaceous:		
Thickness of bed and sample	22	10½

Sample 39525 was taken where new tunnel intersected bed; cover, 225 feet.

Section of "B" bed in New Suntrana (Hill) mine

Laboratory No.	C9526	
	Ft.	*in.*
Roof, arkose:		
Coal	2	9
Coal, solid	1	9
Coal, shaly		2
Coal, solid	3	1
Coal		9½
Coal, shaly		½
Coal, solid	2	7½
Shale, carbonaceous		½
Coal, bony		[a]6
Floor, shale, carbonaceous:		
Thickness of bed	11	9
Thickness of sample	11	3

[a] Not included in sample.

Sample C9526 was taken where new tunnel intersected bed; cover, 200 feet.

Section of "F" bed in New Suntrana (Hill) mine

Laboratory No.	C9527	
	Ft.	*in.*
Roof, clay, sandy:		
Coal, dirty		[a]5
Rock		[a]2
Coal, clean		[a]7
Rock		[a]8
Coal	[a]1	3
Bone		[a]7
Coal		[a]9
Coal, dirty		[a]7
Coal, dirty, and bone	[a]1	3
Coal, hard, blocky	14	0
Floor, hard clay:		
Thickness of bed	20	3
Thickness of sample	14	0

[a] Not included in sample.

Sample C9527 was taken where new tunnel intersected bed; cover, 250 feet.

Section of "D" bed in New Suntrana (Hill) mine

Laboratory No.	C9530		Laboratory No.	C9530	
	Ft.	*in.*		*Ft.*	*in.*
Roof, clay:			Coal, bony		[a] 6
Sandstone	[a] 1	2	Coal, solid	2	8
Shale		[a] 10	Floor, clay:		
Clay		[a] 8	Thickness of bed	8	4
Coal, hard, bright	2	9	Thickness of sample	5	5
Bone and rock	[a] 1	4			
Coal, dirty	[a] 1	1			

[a] Not included in sample.

Sample C9530 was taken where new tunnel intersected bed; cover, 250 feet. System of mining, chute-and-pillar. The coal was shot down with explosives. It was screened on shaker screens to produce lump nut, nut, and chestnut sizes. Production in 1942 was 100,000 tons. In 1943 the life of the mine was estimated to be 10 years.

Section of No. 4 bed in Old Suntrana mine

Laboratory No.	C9528		Laboratory No.	C9528	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale, banded:			Parting		¼
Bone		[a] 2	Coal, solid	3	4
Coal	3	8½	Parting		¼
Parting		¼	Coal, solid	1	3
Coal		8½	Bone		[a] 6
Parting		½	Floor, shale:		
Coal, solid	1	½	Thickness of bed	13	5¼
Parting		½	Thickness of sample	12	9¼
Coal, solid	2	7			

[a] Not included in sample.

Sample C9528 was taken in east 131 chute, 7,200 feet east of main-entry crosscut; cover, 225 feet.

Section of No. 6 bed in Old Suntrana mine

Laboratory No.	C9529		Laboratory No.	C9529	
	Ft.	*in.*		*Ft.*	*in.*
Roof, sandstone:			Bone		[a] 6
Coal, bony		[a] 8	Floor, shale:		
Coal	16	0	Thickness of bed	21	11
Shale	[a] 1	9	Thickness of sample	16	0
Coal	[a] 3	0			

[a] Not included in sample.

Sample C9529 was taken in 1 chute on main-haulage pillar; cover, 300 feet.

SUNTRANA, PROSPECTS

Analyses C31323 to C31327 (p. 36). Subbituminous C and weathered subbituminous coals, Nenana field, from prospects in secs. 11 and 14, T. 12 S., R. 6 W., 5 to 7 miles from Suntrana. The beds were measured and sampled at five points by James Hulbert (USBM), September 20, 1944, as described below:

Sections of coal beds sampled

Section	A		B		C		D		E	
Laboratory No.	C31323		C31324		C31325		C31326		C31327	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, not stated:										
Coal	5	7	5	2	5	8	6	2	7	1
Overburden, frozen		[a] 7								
Mud										4
Coal	7	10							10	8
Coal, dirty, bony									[a] 1	10
Floor, not stated:										
Thickness of bed	14	0	5	2	5	8	6	2	19	11
Thickness of sample	13	5	5	2	5	8	6	2	18	1

[a] Not included in sample.

Samples C31323, C31324, and C31327 were trench samples Nos. 51, 52, and 53, respectively. Samples C31325 and C31326 were taken from outcrops.

Suntrana. Suntrana Mine

Analyses B80608 to C80610 (p. 36). Subbituminous C coal, Nenana field, from Suntrana mine, a drift mine at Suntrana, in T. 12 S., R. 7 W. Coal bed, Donaldson (No. 3); dip, 27° to 33° N.; strike, N. 70° E. The bed was measured and sampled at three points by M. L. Sharp (USBM) and H. L. Feidler (USBM), June 19 to 21, 1942, as described below:

Sections of Donaldson (No. 3) bed in Suntrana mine

Section	A		B	
Laboratory No.	B80609		B80610	
	Ft.	*in.*	*Ft.*	*in.*
Roof, coal:				
Coal		[a] 2		
Parting		[a] ½		
Coal	[a] 1	9		
Parting		[a] 1/16		
Coal, crushed	1	0	3	1
Parting		1/16		1/16
Coal, shattered	2	0	5	2
Parting		1/16		¼
Coal, blocky		10	3	6
Parting		1/16		
Coal and bony coal			2	6
Coal, solid	6	8		
Bone				[a] 1
Floor, coal:				
Thickness of bed	12	5¾	14	4 5/16
Thickness of sample	10	6 3/16	14	3 5/16

[a] Not included in sample.

Sample B80608 (10 feet 11 inches) was taken at face of east gangway, 15 switch, 20 chute; sample B80609, from side-wall face of counter, between 37 and 38 rooms, 55 feet above gangway; and sample B80610, at face of east gangway, 36 switch, 40 chute.

System of mining, room-and-pillar. The coal was shot down with explosives. It was screened on shaker screens to produce lump-nut, nut, and chestnut sizes. The mine produced 75,000 tons in 1941, 75 percent from advance workings. The average daily output was 300 tons. In 1942 the life of the mine was estimated to be 100 years.

Tatlanika Creek. Outcrop

Analysis 17797 (p. 38). Weathered lignite, Nenana field, from outcrop on right bank of Tatlanika Creek, 6 miles below mouth of Grubstake Creek. The bed was measured and sampled at one point by J. A. Holmes (USGS), August 29, 1913. The sample represented only 2 feet of shaly, weathered material beginning 1 foot from the top of the bed. The exposed part of the bed was 8 to 9 feet thick, and the lower part was concealed by flood-plain gravel at creek level.

Geologic relations are given in Geological Survey Bulletin 501 (p. 61).

Unalakleet, Prospects

Analysis C36296 (p. 38). Weathered subbituminous coal, Unalakleet district, from prospect in clay cliff on Mine Creek, Norton Sound, 10 miles south of Unalakleet. The sample was taken by R. M. Chapman (USGS) in 1944.

Analysis B64867 (p. 38). Subbituminous coal, Unalakleet district, from prospect 12 miles south of Unalakleet. The bed is 4 to 8 feet thick. The sample was submitted by C. G. Sherman (Office of Indian Affairs) in 1941.

KUSKOKWIM REGION

Nelson Island, Prospect

Analysis A15868 (p. 38). Weathered bituminous coal, Nelson Island district, from prospect on Nelson Island. The sample was taken by a trader from an 18-inch bed and transmitted by M. L. Sharp (USBM) in 1925.

Sleitmut, Prospect

Analyses B91995 and B91996 (p. 38). Peat, from prospect on quicksilver property near Sleitmut. The samples were submitted by H. E. Heide (USBM), December 11, 1942.

SOUTHWESTERN ALASKA REGION

Chignik Bay, Alaska Packers' Association Mine

Analysis 6953 (p. 40). High-volatile C bituminous coal, Chignik Bay district, from Alaska Packers' Association mine on north side of Chignik River, 2 miles below Chignik Lake; latitude 56°20′ N.; longitude, 158° W.; Chignik formation. The bed was measured and sampled at one point by W. W. Atwood (USGS) in 1908.

Geologic relations are given in Geological Survey Bulletin 467 (p. 97).

Chignik Bay, Hook Bay Mine

Analysis 6952 (p. 40). High-volatile A bituminous coal, Chignik Bay district, from Hook Bay mine on west side of main stream, 7 miles northwest of Hook Bay, east side of Chignik Bay. Chignik formation; strike, N. 11° E.; dip, 34° E. The bed was measured and sampled at one point by W. W. Atwood (USGS) in 1908, as described below:

Section of coal bed in Hook Bay mine

Laboratory No.	6952		Laboratory No.	6952	
	Ft.	*in.*		*Ft.*	*in.*
Roof, sandstone:			Coal, bony		5
Coal	[a] 1	3	Coal	1	5½
Clay		[a] 8	Bone		[a] 1
Coal		[a] 4	Floor, shale:		
Clay		[a] 7	Thickness of bed	6	6
Coal	1	6½	Thickness of sample	3	7
Clay		2			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 467 (p. 99).

Chignik Bay, Thompson Valley Prospect

Analysis 6956 (p. 40). High-volatile C bituminous coal, Chignik Bay district, from prospect in Thompson Valley, 1¾ miles from beach, 300 feet above valley floor, Chignik formation; dip, 21° NW.; strike, N. 61° E. Two beds were measured by W. W. Atwood (USGS) in 1908, as described below:

Section of lower coal bed in Thompson Valley prospect

	Ft.	in.		Ft.	in.
Roof, sandy shale:			Coal		5
Coal		8	Bone		1
Shale	1	2	Coal		2
Coal		6	Floor, sandstone:		
Coal, shaly	2	4	Thickness of bed	5	4

This bed was measured but not sampled.

Section of upper coal bed in Thompson Valley prospect

Laboratory No.	6956		Laboratory No.	6956	
	Ft.	in.		Ft.	in.
Roof, sandstone:			Coal	4	0
Clay		[a] 2	Bone		[a] 8
Coal		[a] 4	Coal		[a] 5
Coal, shaly		[a] 4	Shale		[a] 5
Shale		[a] 8	Coal, bony		[a] 8
Shale, coaly		[a] 4	Floor, not stated:		
Coal	1	0	Thickness of bed	12	3
Clay		[a] 1	Thickness of sample	7	6
Coal	2	6			
Shale, coaly		[a] 8			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 467 (p. 112).

CHIGNIK BAY. WHALERS CREEK MINE

Analysis 6955 (p. 40). High-volatile B bituminous coal, Chignik Bay district, from Whalers Creek mine, ¾ mile above mouth of Whalers Creek, at Chignik Lagoon. Chignik formation; dip, 22° E.; strike, N. 5° E. The bed was measured and sampled at one point by W. W. Atwood (USGS) in 1908, as described below:

Section of coal bed in Whalers Creek mine

Laboratory No.	6955		Laboratory No.	6955	
	Ft.	in.		Ft.	in.
Roof, sandstone:			Sandstone	[a] 1	6
Shale, coaly		[a] 10	Coal	1	10
Shale		[a] 8	Coal, shaly		1½
Coal	[a] 1	0	Coal	3	4
Shale, coaly		[a] 4	Floor, shale:		
Shale, sandy		[a] 7	Thickness of bed	15	8½
Coal and slate	[a] 5	0	Thickness of sample	5	3½
Shale, coaly		[a] 6			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 467 (p. 111).

HERENDEEN BAY. JOHNSON TUNNEL

Analysis 6951 (p. 40). High-volatile C bituminous coal, Herendeen Bay district, Johnson tunnel, 1¼ miles above mouth of Mine Creek, 870 feet above sea level. Chignik formation; dip, 34° NE.; strike, N. 101° E. The bed was measured and sampled at one point by W. W. Atwood (USGS) in 1908, as described below:

Section of coal bed in Johnson tunnel

Laboratory No.	6951		Laboratory No.	6951	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale:			Floor, clay:		
Coal	[a] 1	4	Thickness of bed	7	1
Shale		[a] 9	Thickness of sample	5	0
Coal	5	0			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 467 (p. 102).

Herendeen Bay. Lower Tunnel

Analysis 6957 (p. 40). High-volatile C bituminous coal, Herendeen Bay district, from Lower tunnel, ¾ mile above mouth of Mine Creek. Chignik formation; dip, 30° N.; strike, N. 91° E. The bed was measured and sampled at one point by W. W. Atwood (USGS) in 1908, as described below:

Section of coal bed in Lower tunnel

Laboratory No.	6957		Laboratory No.	6957	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale:			Coal, shaly		2
Coal, shaly	1	1	Coal	1	4
Bone		2	Floor, shale:		
Coal	1	1	Thickness of bed and sample	3	10

Lower tunnel was near the stream bed, 275 feet above sea level, and had been driven 150 feet along the strike of coal. The roof was firm, and no timbering was necessary except at the entrance. About 20 tons was taken from this drift in 1907 for use in drilling and for domestic purposes.

Geologic relations are given in Geological Survey Bulletin 467 (p. 102).

Herendeen Bay. Prospects on Mine Creek

Analyses X1 to X11 (p. 40). High-volatile C and weathered bituminous coals, Herendeen Bay district, from prospects along Mine Creek. The samples were collected in 1942: Samples X1 to X9, by Army engineers; sample X10, by R. S. Sanford (USBM); and sample X11, by Lt. Col. C. W. Jeffers (Quartermaster Corps).

Sample X1 (weathered coal) was taken from prospect at creek level. Thickness of bed, 42 inches; dip, horizontal; strike, S.; roof and floor, shale. Sample X2 (weathered coal) was taken from prospect above mine. Thickness of bed, 35 feet; dip, 70°; strike, NE. The coal was in layers, none thicker than 36 inches, separated by rock layers 2 to 24 inches thick. Sample X3 (weathered coal) was taken from vicinity of lower tunnel. Thickness of bed, 18 feet; dip, 60°; strike, NE. The coal layers, none of which was thicker than 24 inches, were separated by rock layers ¼ to 24 inches thick. Sample X4 (weathered coal) was taken from bed being mined. Thickness of bed, 54 to 60 inches; dip, 45°; strike, NE. The bed was exposed for 500 yards along valley. Sample data were not given for sample X5. Sample X6 (weathered coal) was taken from bed being mined. Dip, 45°; strike, NE. The main bed was separated from several others by 4 feet of soapstone. Sample X7 (weathered coal) was taken from a cliff on first stream below one on which mine was located. Thickness of bed, 35 feet; dip, 20°; strike, E. The bed was broken up by layers of rock. Sample X8 was taken farther down stream, near lower-tunnel area, from same bed as sample X3. Sample X9 (weathered coal) was taken between sample X3 and X8 and was part of same seam. Sample X10 was taken about 50 feet from Johnson tunnel. Thickness of bed, 48 inches; dip, 35° NE.; strike, S. 80° E.

Sample X11 was taken 6 feet stratigraphically below sample X10. Thickness of bed, 42 inches; dip, 35° NE; strike, S. 80° E.

UNGA ISLAND. COAL HARBOR MINE

Analysis 6954 (p. 40). Lignite, Unga Island district, from Coal Harbor mine on Coal Harbor. Kenai formation; dip, 8° W.; strike, N. 12° W. The bed was measured and sampled at one point by W. W. Atwood (USGS) in 1908, as described below:

Section of coal bed in Coal Harbor mine

Laboratory No.	6954		Laboratory No.	6954	
	Ft.	*in.*		*Ft.*	*in.*
Roof, conglomerate:			Clay		[a] 3
Lignite	1	1	Lignite	1	2
Sand		[a] 6	Floor, not stated:		
Lignite		8	Thickness of bed	3	10
Shale, coaly		[a] 2	Thickness of sample	2	11

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 467 (p. 119).

COOK INLET REGION

COOK INLET FIELD

BLUFF POINT. BLUFF POINT MINE

Analyses 81606 to 81609 (p. 40). Subbituminous C coal, Cook Inlet field, from Bluff Point mine at Bluff Point. Coal bed, Cooper; height above sea level, 26 feet. The bed is level; it was measured and sampled at three points by B. W. Dyer (USBM), August 23, 1921, as described below:

Sections of coal bed in Bluff Point mine

Section	A		B		C	
Laboratory No.	81606		81607		81608	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, clay:						
Coal	3	4½	1	0	4	2½
Coal, bony		2				
Slate				¼		
Clay						[a] 3½
Coal		8½	2	5		6
Coal, bony		1				
Bone				1		1
Coal	1	2	1	0		6
Bone				2		
Coal			1	1		
Floor, clay:						
Thickness of bed	5	6	5	9¼	5	7
Thickness of sample	5	6	5	9¼	5	3½

[a] Not included in sample.

Sample 81606 was taken from right rib, 5 feet from face of 3 room, 1 west gangway; sample 81607, from face of 4 room, 1 west gangway; and sample 81608, from rib of 3 crosscut, between 3 and 4 rooms, 1 west gangway.

The ultimate analysis of a composite made by combining samples 81606 to 81608 is given under laboratory No. 81609.

System of mining, room-and-pillar. The coal was shot from the solid with black powder. It was shipped from the mine by boat. The average daily output at the time of sampling was 25 tons.

KACHEMAK BAY. OUTCROPS

Analyses 4457 and 4429 (p. 42). Subbituminous coal, Cook Inlet field, Kachemak Bay district, from outcrops. The beds were measured and sampled by W. W. Atwood (USGS) in 1908.

Sample 4457 was taken from an outcrop 3 miles east of Homer Spit and sample 4429, from a 6-foot outcrop 1 mile west of Homer Spit.

Geologic relations are given in Geological Survey Bulletin 379 (pp. 110–122).

Analyses 4426 and 4432 (p. 42). Subbituminous coal, Cook Inlet field, Kachemak Bay district, from outcrops southeast of Anchor Point. The beds were measured and sampled by W. W. Atwood (USGS) in 1908, as described below:

Section of coal bed in outcrop ¾ mile west of Diamond Creek

Laboratory No.	4426		Laboratory No.	4426	
	Ft.	in.		Ft.	in.
Roof, shale:			Coal	2	7
Coal		3	Floor, clay:		
Shale		[a] 5	Thickness of bed	4	5
Coal	1	0	Thickness of sample	3	10
Shale		[a] 2			

[a] Not included in sample.

Section of coal bed in outcrop 1½ miles east of Troublesome Gulch

Laboratory No.	4432		Laboratory No.	4432	
	Ft.	in.		Ft.	in.
Roof, sand:			Floor, clay:		
Coal	2	0	Thickness of bed	4	0
Shale		[a] 3	Thickness of sample	3	9
Coal	1	9			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 379 (p. 110).

PORT GRAHAM. OUTCROPS

Analysis 4458 (p. 42). Subbituminous coal, Cook Inlet field, from outcrop on north shore of Port Graham. The bed represented 8 to 9 feet of coal, including some bone, and was measured and sampled by W. W. Atwood (USGS) in 1908.

Geologic relations are given in Geological Survey Bulletin 379 (p. 110).

Analysis 17489 (p. 42). Subbituminous coal, Cook Inlet field, from outcrop at Port Graham. Dip, 11°; strike, N. 22° W. The bed was measured and sampled at one point by G. W. Evans (USGS), June 2, 1913, as described below:

Section of coal bed in outcrop at Port Graham

Laboratory No.	17489		Laboratory No.	17489	
	Ft.	in.		Ft.	in.
Roof, sea beach:			Coal, blocky	1	8
Bone		[a] 11	Floor, concealed:		
Shale		[a] 5	Thickness of bed	3	10
Coal, blocky		8	Thickness of sample	2	4
Shale		[a] 2			

[a] Not included in sample.

TYONEK. OUTCROPS

Analyses 4425, 4464, and 4465 (p. 42). Subbituminous coal, Cook Inlet field, from outcrops south of Tyonek. The beds were measured and sampled by W. W. Atwood (USGS) in 1908.

Sample 4425 was composed of loose coal pebbles from a conglomerate. Sample 4465 was taken at south end of Tyonek beach, 4 miles south of Tyonek. Sample 4464 was taken at first outcrop on west shore of Cook Inlet, 3 miles south of Tyonek.

Geologic relations are given in Geological Survey Bulletin 379 (p. 110).

Analyses 4434 and 4456 (p. 42). Subbituminous coal, Cook Inlet field, from outcrops on Beluga River. The beds were measured and sampled by W. W. Atwood (USGS) in 1908.

Samples 4434 and 4456 were taken 10 and 10¼ miles, respectively, above the canyon and rapids of Beluga River.

MATANUSKA FIELD

ANTHRACITE RIDGE. OUTCROPS

Analysis 2222 (p. 42). Anthracite, Matanuska field, Anthracite Ridge district, from outcrop on north side of Matanuska Valley between Boulder and Hicks Creeks, 18 miles from Chickaloon. Thickness of bed, 38 feet. The bed was measured and sampled by G. C. Martin (USGS) in 1905.

Geologic relations are given in Geological Survey Bulletins 327 (pp. 52–56) and 861.

Analysis 4754 (p. 42). Bituminous coal, Matanuska field, Anthracite Ridge district, from outcrop at east end of ridge, 3,600 feet above sea level. The bed was measured and sampled at one point by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in outcrop at east end of Anthracite Ridge

Laboratory No.	4754		Laboratory No.	4754	
	Ft.	in.		Ft.	in.
Roof, sandstone:			Coal		10
Coal	[a] 2	6	Floor, shale:		
Coal and shale		[a] 4	Thickness of bed	4	4
Coal		[a] 6	Thickness of sample		10
Coal and clay		[a] 2			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletins 327 (p. 55) and 861.

Analysis 17792 (p. 42). Bituminous coal, Matanuska field, Anthracite Ridge district, from outcrop 5,800 feet above sea level, overlooking Matanuska Glacier. The bed was measured and sampled at one point on Anthracite Ridge, 500 feet from eastern end of field, by J. T. Ryan (USGS), August 23, 1913.

Geologic relations are given in Geological Survey Bulletins 592 (p. 282) and 861.

Analysis 12746 (p. 42). Anthracite, Matanuska field, Anthracite Ridge district, from outcrop 3,700 feet above sea level, near middle of south face of ridge. The bed was measured and sampled by J. A. Holmes (USGS) in 1911.

Geologic relations are given in Geological Survey Bulletins 327 (pp. 52–56) and 861.

Analysis 12757 (p. 42). Semianthracite, Matanuska field, Anthracite Ridge district, from outcrop 4,100 feet above sea level, near middle of south slope. The bed was measured and sampled by J. A. Holmes (USGS), October 26, 1911.

Geologic relations are given in Geological Survey Bulletins 327 (pp. 52–56) and 861.

Analyses A3538 to A3540 (p. 42). Weathered anthracite, Matanuska field, Anthracite Ridge district, from outcrop on west fork of Purinton Creek. Beds

Nos. 2, 3, and 4 were sampled by S. R. Capps (USGS) and J. J. Carey (USGS), July 20, 1924.

Sample A3538 (No. 2 bed) was taken at an elevation of 3,925 feet. Thickness of bed, approximately 40 feet; dip, 48° SE.; strike, N. 55° E. Sample A3539 (No. 3 bed) was taken at an elevation of 4,240 feet. Thickness of bed, not given; dip, 48° SE.; strike, N. 55° E. Sample A3540 (No. 4 bed) was taken a little lower than A3539 (elevation not given). Thickness of bed, not given; dip, 36° NW.; strike, N. 60° E.

Anthracite Ridge. Prospects

Descriptions of samples taken from prospects on Anthracite Ridge by the United States Geological Survey in 1931 follow. The analyses were made by M. L. Sharp (USBM) at Anchorage.

Analysis X4488 (p. 44). Bituminous coal from prospect on crest of a southern spur of Anthracite Ridge, in NW¼SW¼ sec. 3, T. 20 N., R. 7 E.; dip, 70° N. 25° E. The test pit showed one bed 24 inches thick, containing crushed coal, underlain by four other beds, 6, 9, 10, and 10 inches thick, separated by a few inches of shale. The analysis was made on a composite of the five beds.

Analysis X4809 (p. 44). Semianthracite, from prospect in ravine of middle branch of Meadow Creek, in SW¼NE¼ sec. 11, T. 20 N., R. 7 E. Thickness of bed, 12 inches; dip, 30° to 80° S.

Analysis X4484 (p. 44). Bituminous coal, from prospect near base of small ridge at foot of main slope of Anthracite Ridge, in NW¼SE¼ sec. 11, T. 20 N., R. 7 E. Thickness of bed, 2 feet of crushed, shaly coal; dip, 70° S.

Analysis X4480 (p. 44). Semianthracite, from prospect on ridge between Meadow and Chikootna Creeks, in SW¼NW¼ sec. 12, T. 20 N., R. 7 E. The test pit exposed two beds of coal, 3 feet and 4 feet 9 inches thick, separated by 15 inches of shale and coaly shale; dip, 60° S. 25° E. The analysis was made on a composite of the two beds.

Analysis X4490 (p. 44). Semianthracite, from prospect on west side of ravine of Purinton Creek, in SE¼NW¼ sec. 12, T. 20 N., R. 7 E. Thickness of bed, 16 feet; dip, 30° S.

Analyses X4444, X4486, and X4485 (p. 44). Semianthracite and bituminous coal, from prospect on west side of ravine of Purinton Creek (south of west from location X4490). A large test pit showed 24 feet of coal. The coal was divided into four benches by shale parting 3 or 4 inches thick. Sample X4444 represented the top bench; thickness, 10 feet. Sample X4486 represented the second and third benches; thickness, 3 and 4 feet, respectively. Sample X4485 represented the bottom bench; thickness, 7 feet. The three upper benches were semianthracite, and the lower was bituminous coal.

Analyses X4443, X4445, X4446, and X4391 (p. 44). Semianthracite, from prospect on west bank of ravine of Purinton Creek, 200 to 300 feet north of small mass of diabase, in SE¼NW¼ sec. 12, T. 20 N., R. 7 E. Thickness of bed, 35 to 40 feet; dip, 20° N. 20° E. The bed was measured and sampled at four points by R. W. Richards (USGS) in 1931 in approximately 8-foot sections from the top.

Analysis X4466 (p. 44). Bituminous coal, from prospect in ravine of Upper Winding Creek, in NE¼NE¼ sec. 17, T. 20 N., R. 8 E. Thickness of bed, 5 feet; dip, 10° N. 10° E.

Analysis X4483 (p. 44). Bituminous coal, from prospect on east side of main ravine of Upper Muddy Creek, in SW¼SE¼ sec. 9, T. 20 N., R. 8 E. Thickness of bed, 6 feet 2 inches (shale parting in middle of bed).

Analysis X4482 (p. 44). Bituminous coal, from prospect on southernmost point of ridge between Muddy Creek and Packsaddle Gulch, in NW¼NW¼ sec. 22, T. 20 N., R. 8 E. Thickness of bed, 7 feet 6 inches; dip, 20° NW.

Analysis X4489 (p. 44). Bituminous coal, from prospect on southernmost prominent exposure of coal on Muddy Creek, in NE¼SW¼ sec. 16, T. 20 N.,

R. 8 E. Thickness of bed, 6 feet; dip, 30° SW. The bed was near stream level at base of bluff.

Analysis X4481 (p. 44). Bituminous coal, from prospect on south bank of Lower Purinton Creek, in SW¼NW¼ sec. 23, T. 20 N., R. 7 E. Thickness of bed, 36 inches of crushed, shaly coal; dip, 70° N.

Analysis X4808 (p. 44). Bituminous coal, from prospect on east side of Lower Purinton Creek, in NW¼SW¼ sec. 23, T. 20 N., R. 7 E. Thickness of bed, 12 inches; dip, 20° N. 20° E.

Geologic relations are given in Geological Survey Bulletin 861.

CHICKALOON. CHICKALOON (NAVY) MINE

Analyses 83981, 83982, 83174, 85745 to 85748, 85283, 85284, 83983, 83173, 85749 to 85754, 85285, 85740 to 85744, 83984, and 85755 (p. 44). Low-volatile bituminous coal, Matanuska field, from Chickaloon (Navy) mine, ¼ mile from Chickaloon. Coal beds, Nos. 1, 3, 4, 5, Upper No. 5, Nos. 6, 8, and 10. The Navy Alaskan Coal Commission carried on exploratory work at Chickaloon from July 1, 1920, to April 30, 1922. The beds were measured and sampled by Capt. W. P. T. Hill, Marine Corps, as described below:

Sections of No. 1 bed in Chickaloon (Navy) mine

Section	A		B		Section	A		B	
Laboratory No.	83981		83982		Laboratory No.	83981		83982	
	Ft.	*in.*	*Ft.*	*in.*		*Ft.*	*in.*	*Ft.*	*in.*
Roof, shale:					Coal		4		4
Bone		8		[a] 8	Bone		8		[a] 8
Coal	3	0	3	0	Floor, sandstone:				
Shale		½		[a] ½	Thickness of bed	5	8	5	8
Coal		10		10	Thickness of sample	5	8	4	2
Shale		1½		[a] 1½					

[a] Not included in sample.

Samples 83981 and 83982 were taken 15 feet south of station 541, 2 south entry, 2 west counter Z

Sections of No. 3 bed in Chickaloon (Navy) mine

Section	A		B		C		D		E		F	
Laboratory No.	83174		[a] 85745		[a] 85746		[a] 85747		85283		85284	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, shale:												
Coal, bony, shale:	1	0										
Shale, sandy		1										
Coal	2	6	2	1	2	2	2	0	1	10½	1	8
Shale		1		1		1		1		1		1
Coal		6		8		9		8		9½		6
Shale												1
Floor, shale:												
Thickness of bed and sample	4	2	2	10	3	0	2	9	2	9	2	4

[a] Silicified trees excluded from sample

Sample 83174 was taken 40 feet west of station 515, 2 west gangway; sample 85745, from 2 east counter, 27 room, 1 crosscut; sample 85746, from 2 east counter, 28 room, 1 crosscut; sample 85747, from 2 east counter, 26 room, 1 crosscut; sample 85283, from 2 east counter, 70 feet east of station 614; sample 85284, from 2 east gangway, 6 feet north of station 269.

The ultimate analysis of a composite made by combining samples 85745 to 85747 is given under laboratory No. 85748.

Section of No. 4 bed in Chickaloon (Navy) mine

Laboratory No.	83983	Laboratory No.	83983
	Ft. in.		Ft. in.
Roof, shale:		Bone	[a] 1 9
Coal	10	Floor, shale:	
Shale	½	Thickness of bed	3 6½
Coal and bone	11	Thickness of sample	1 9½

[a] Not included in sample.

Sample 83983 was taken 17 feet south of 2 east counter, 1 south crosscut.

Section of No. 5 bed in Chickaloon (Navy) mine

Laboratory No.	83173	Laboratory No.	83173
	Ft. in.		Ft. in.
Roof, shale, sandy:		Coal	3 9
Shale, black	1	Coal, bony, shaly	2 0
Coal	6	Coal	2 4
Shale	1⅛	Floor, shale, sandy:	
Coal	½	Thickness of bed and sample	8 10
Shale	⅜		

Sample 83173 was taken 40 feet east of station 520, 2 east gangway.

Sections of Upper No. 5 bed in Chickaloon (Navy) mine

Section	A		B		C		D		E	
Laboratory No.	85749		85750		85751		85752		85753	
	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.
Roof, not stated:										
Coal		[a] 9		9		[a] 9		[a] 9		[a] 9
Shale, coal, and shale		[a] 3½		3½		[a] 3½		[a] 3½		[a] 3½
Coal	2	8	3	2	2	4	3	2	2	6
Bone	1	0		9	1	8	1	3	1	0
Coal		8		6	1	0	1	0	1	4
Floor, not stated:										
Thickness of bed	5	4½	5	5½	6	½	6	5½	5	10½
Thickness of sample	4	4	5	5½	5	0	5	5	4	10

[a] Not mined in these sections.

Sample 85749 was taken at 2 west counter, 6 room, 24 feet above counter cap; sample 85750, at 2 west counter, 7 room, 6 feet above counter cap; sample 85751, at 2 west counter, 5 room, 6 feet above 1 crosscut; sample 85752, at 2 west counter, 3 room, 8 feet above 1 crosscut; and sample 85753, at 2 west counter, 4 room, 8 feet above 1 crosscut.

The ultimate analysis of a composite made by combining samples 85749 to 85753 is given under laboratory No. 85754.

No. 6 bed (sample 85285) consisted of 1 foot 6 inches of coal underlain by 1 foot 2 inches of bone and coal. The sample was taken 32 feet north of 5 west gangway in tunnel G.

Sections of No. 8 bed in Chickaloon (Navy) mine

Section	A		B		C		D	
Laboratory No.	85740		85741		85742		85743	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof	(a)		(b)		(b)		(b)	
Bone		2						
Bone and shale						6		
Coal	1	6			2	0		
Shale		½						
Bone and shale						1		
Coal		5		5		6		
Shale		2		1		1		
Coal	2	1	2	10	2	0		
Bone		2						
Sandstone		[c] 6		[c] 7		[c] 6		[c] 6
Coal		10	1	2		10	1	2
Sandstone and shale		5						
Bone and shale				6		1		6
Coal	1	3	2	2	1	6	3	6
Bone and shale	1	0						6
Shale						8		
Bone				7				
Coal	1	2			2	4		
Coal, bony and shaly			9	4				
Bone and shale		1				6		
Coal		10						
Shale		½						
Coal		7						
Coal, bone and shale	1	9						
Floor, not stated:								
Thickness of bed	13	0	17	8	11	7	6	2
Thickness of sample	12	6	17	1	11	1	5	8

[a] Broken sandstone. [b] Not stated. [c] Not included in sample.

Sample 85740 was taken at 13 crosscut, 1 slope to 1 slope aircourse; cover, 720 feet. Sample 85741 was taken at west face of manway between 2 west gangway and Old slope; cover, 375 feet. Sample 85742 was taken from 5 room, 2 west gangway, 8 west counter, 8 feet east of 3 crosscut; cover, 217 feet. Sample 85743 was taken from 6 room, 2 west gangway, 8 west counter, 3 crosscut; cover, 217 feet.

The ultimate analysis of a composite made by combining samples 85740 to 85743 is given under laboratory No. 85744.

Sections of No. 10 bed in Chickaloon (Navy) mine

Section	A		B		Section	A		B	
Laboratory No.	83984		85755		Laboratory No.	83984		85755	
	Ft.	*in.*	*Ft.*	*in.*		*Ft.*	*in.*	*Ft.*	*in.*
Roof, shale:					Coal	1	3		10
Bone and coal	[a] 1	8			Shale				1
Sandstone		[a] 3			Bone and coal		[a] 10		
Bone and coal		4			Coal				9
Coal	1	6		8	Shale				1
Bone and coal	[a] 2	0			Bone and shale			1	0
Shale				½	Floor, shale:				
Coal		8		7	Thickness of bed	8	7	4	1
Shale		1		½	Thickness of sample	3	10	4	1

[a] Not included in sample.

Sample 83984 was taken 84 feet west of station 572, west gangway; cover, 100 feet. Sample 85755 was taken from 3 east counter, 9 feet west of station 604; cover, 623 feet.

Chickaloon. Coal Creek (Navy) Mine

Analyses 85282, 83985, 85277 to 85279, 83986, 83987, 80608, 80607, and 85640 (p. 46). Low- and medium-volatile bituminous coals, Matanuska field, from Coal Creek (Navy) mine on east bank of Coal Creek, 2½ miles south of Chickaloon. Coal beds: Bardin, North Spaulding, North Tierney, Olson, and Spaulding. The beds were measured and sampled by Capt. W. P. T. Hill (USMC) during 1921–22, as described below:

Section of Bardin bed in Coal Creek (Navy) mine

Laboratory No.	85282	
	Ft.	in.
Roof, shale:		
Shale		1
Coal		11
Shale		1½
Coal	1	1½
Floor, sandstone:		
Thickness of bed and sample	2	3

Sample 85282 was taken in north gangway, 51 feet east of portal.

Sections of North Spaulding bed in Coal Creek (Navy) mine

Section	A		B		C		D	
Laboratory No.	83985		85277		85278		85279	
	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.
Roof, shale:								
Coke							[a] 3	0
Shale				9		9		1½
Coal	3	1	1	10	1	5		8
Shale		[a] ½						4
Shale and bone				5		2		
Coal	1	6	1	7	1	8	1	8
Sandstone		[a] 4½		[a] 4		[a] 4		
Shale								2
Coal		9		8		10	1	8
Shale				1		1		
Floor	(b)		(b)		(b)		(c)	
Thickness of bed	5	9	5	8	5	3	7	7½
Thickness of sample	5	4	5	4	4	11	4	7½

[a] Not included in sample. [b] Shale. [c] Sandstone.

Sample 83985 was taken in 2 North Spaulding gangway, 50 feet east of station 42; sample 85277, at 2 North Spaulding counter, 32 feet east of 9 raise; sample 85278, at 2 North Spaulding gangway, 76 feet east of station 53; and sample 85279, at 1 North Spaulding counter, 17 feet east of portal.

Sections of North Tierney bed in Coal Creek (Navy) mine

Laboratory No.	83986		83987	
	Ft.	in.	Ft.	in.
Roof, shale, sandy:				
Coal	2	2	2	2
Shale		½		[a] ½
Bone		9		[a] 9
Shale		1		[a] 1
Coal, bony	1	4	[a] 1	4
Floor, shale, sandy:				
Thickness of bed	4	4½	4	4½
Thickness of sample	4	4½	2	2

[a] Not included in sample.

Samples 83986 and 83987 were taken in North Tierney gangway, 50 feet from east portal. The impurities were excluded from sample 83987.

Sections of Olson bed in Coal Creek (Navy) mine

Section	A		B	
Laboratory No.	80603		85640	
	Ft.	in.	Ft.	in.
Roof, sandstone:				
Coal		10		9
Coal, shaly		6		9
Coal	3	0	1	6

Section	A		B	
Laboratory No.	80608		85640	
	Ft.	in.	Ft.	in.
Floor, shale:				
Thickness of bed and sample.	4	4	3	0

Sample 80608 was taken in north Olson gangway, 20 feet east of R2 Olson gangway, 250 feet east of portal; and sample 85640, at face above 1 raise, 2 north Olson gangway.

Section of Spaulding bed in Coal Creek (Navy) mine

Laboratory No.	80607		Laboratory No.	80607	
	Ft.	in.		Ft.	in.
Roof, shale:			Coal	5	0
Coal	1	0	Floor, not stated:		
Shale, hard		2	Thickness of bed and sample	6	2

Sample 80607 was taken 250 feet east of portal in North Spaulding gangway. Approximately 1,300 tons of coal was produced during prospecting. Further work was not justified because of the small quantity of minable coal found. The mine was reopened by private capital in 1925 on the west side of Coal Creek by extending the Navy prospects. Operation was continued until 1930. During this period 1,650 tons of coal was produced, coked at Anchorage, and used in foundry of the railroad shops.

ESKA. ESKA MINE

Analyses 28733, 28735, 28734, 28731, 28732, and B67588 (p. 48). High-volatile A and high-volatile B bituminous coals, Matanuska field, Eska Creek district, at Eska, in sec. 16, T. 19 N., R. 3 E. Coal beds, David, Emery, Eska (Upper), Maitland (Kelly), and Upper Shaw. The first four beds were measured and sampled by G. W. Evans (USBM) in May 1917, and the last bed was measured and sampled by M. L. Sharp (USBM), October 1, 1941, as described below:

Section of David bed in Eska mine

Laboratory No.	28733		Laboratory No.	28733	
	Ft.	in.		Ft.	in.
Roof, shale and bony coal:			Coal		10
Coal, bony		[a] 2	Floor, bone and shale:		
Coal	1	6	Thickness of bed	2	7
Shale		[a] 1	Thickness of sample	2	4

[a] Not included in sample.

Sample 28733 was taken in 2 chute, 75 feet from portal.

Section of Emery bed in Eska mine

Laboratory No.	28735		Laboratory No.	28735	
	Ft.	in.		Ft.	in.
Roof, coal and bone:			Bone	[a] 1	0
Coal	2	0	Floor, shale:		
Coal, bony		8	Thickness of bed	3	10
Shale		[a] 2	Thickness of sample	2	8

[a] Not included in sample.

Sample 28735 was taken in 1 chute, 60 feet from portal.

Sample 28734, representing the upper part of Eska bed, was taken in 1 chute. Roof, shale; floor, bone and shale.

Sections of Maitland (Kelly) bed in Eska mine

Section	A	B	Section	A	B
Laboratory No	[a] 28731	[b] 28732	Laboratory No	[a] 28731	[b] 28732
	Ft. in.	*Ft. in.*		*Ft. in.*	*Ft. in.*
Roof, shale:			Floor, shale:		
Coal	2 10	1 0	Thickness of bed and sample.	2 10	3 5½
Shale		½			
Coal		2 5			

[a] Upper bench.
[b] Lower bench.

Samples 28731 and 28732 were taken in 1 chute, 80 feet west of portal.

The Maitland bed on the east side of Eska Creek was also known as Kelly bed.

Section of Upper Shaw bed in Eska mine

Laboratory No	B67588	Laboratory No	B67588
	Ft. in.		*Ft. in.*
Roof, shale:		Coal	10½
Coal	1 7	Shale, bony (footwall)	[a] 10
Ironstone	¾	Floor, shale:	
Coal	1 2¼	Thickness of bed	4 8
Ironstone	1½	Thickness of sample	3 10

[a] Not included in sample.

Sample B67588 was taken in 19 room, face of 2 crosscut, 750 feet from main tunnel on west haulage.

System of mining, room-and-pillar. The coal was shot off the solid and screened on bar screens.

The mine was opened in January 1917 and operated until June 1917; lack of capital for exploration forced the operators to sell their equity to the Alaska Railroad. The railroad modernized the mine and operated it until 1921, when private operators on the adjacent property were able to supply the railroad and local demands. The mine was reopened for a short time in 1922 because fire in the Evan Jones mine endangered the railroad's fuel supply. It had been kept in condition for emergency operation. In 1941 the average daily output was 100 tons.

Geologic relations are given in Geological Survey Bulletins 712 (pp. 152–163) and 880d (pp. 205–206).

Eska. McCauley Prospect

Analysis 28836 (p. 50). Bituminous coal, Matanuska field, Eska Creek district, from McCauley prospect 1,600 feet above sea level, in sec. 10, T. 19 N., R. 3 E., 1¼ miles northeast of Eska mine. Coal bed, McCauley; dip, 14° SW. The bed was measured and sampled at one point by G. W. Evans (USBM), May 16, 1917. The sample represented 9 feet 8 inches of coal.

Eska Creek. Outcrop

Analysis 29362 (p. 50). Bituminous coal, Matanuska field, Upper Eska Creek district, from an outcrop on the west bank of west fork of Middle Fork, near northern boundary of sec. 9, T. 19 N., R. 3 E. The sample was taken by S. S. Smith (USBM), September 6, 1917.

Jonesville. Evan Jones Mine

Analyses A11087, A11083, 89706, 89705, A11084, 89707, 89708, A11086, A11085, A98201, B25076, B25077, and B56287 (p. 50). High-volatile B bituminous coal, Matanuska field, Eska Creek district, from Evan Jones mine at Jonesville. Coal beds, Nos. 00, 0, 2, 3, 4, 5, 6, 8, and 10. The beds were measured and sampled as follows: Nos. 00, 0, 3, 5, and 6, by M. L. Sharp (USBM), February 27, 1925;

Nos. 2, 3, and 4, by Capt. W. P. T. Hill (USMC), February 2, 1923; No. 8, by M. L. Sharp (USBM), August 5, 1940, H. I. Smith (USGS) and B. D. Stewart (USGS), June 22, 1934, and H. B. Humphrey (USBM), November 2, 1937. The measurements of the various samplings are given below:

Section of No. 00 bed in Evan Jones mine

Laboratory No.	A11087		Laboratory No.	A11087	
	Ft.	in.		Ft.	in.
Roof, coal, bony:			Pyrite		1
Coal	1	6	Coal		9
Shale		1	Floor, shale:		
Coal	1	6	Thickness of bed and sample	4	11
Coal, bony		3			
Coal		9			

Sample A11087 was taken from face 6 feet west on crosscut, 750 feet north of portal on main tunnel.

Section of No. 0 bed in Evan Jones mine

Laboratory No.	A11083		Laboratory No.	A11083	
	Ft.	in.		Ft.	in.
Roof, sandrock and coal:			Coal	2	6
Coal	1	3	Floor, shale:		
Bone and coal		6	Thickness of bed and sample	6	1
Coal	1	6			
Bone		4			

Sample A11083 was taken 400 feet in west main tunnel at junction of 1 slant.
Sample 89706 was taken from No. 2 bed at 2 east gangway, 3 chute; thickness of bed, 2 feet 8 inches.

Sections of No. 3 bed in Evan Jones mine

Section Laboratory No.	A 89705		B A11084		Section Laboratory No.	A 89705		B A11084	
	Ft.	in.	Ft.	in.		Ft.	in.	Ft.	in.
Roof	([a])		([b])		Coal			2	10
Coal	4	4	2	2	Parting				1
Shale				1½	Coal			1	3
Coal				4½	Floor, shale:				
Shale				2½	Thickness of bed and sample.	4	4	7	8½
Coal				2					
Shale, bony				6					

[a] Sandstone.
[b] Shale.

Sample 89705 was taken in 3 east gangway, 10 feet from 16 chute; and sample A11084, 500 feet east of main tunnel on upside slant.

Sample 89707 (No. 4 bed) represented 3 feet 4 inches of coal and was taken at 2 west on 4 counter, 28 feet west on 1 chute. Sample 89708 (No. 4 bed) represented 3 feet 7 inches of coal and was taken at 2 east on 4 east gangway, 10 feet from 6 chute.

Section of No. 5 bed in Evan Jones mine

Laboratory No.	A11086		Laboratory No.	A11086	
	Ft.	in.		Ft.	in.
Roof, coal, bony:			Coal		10
Coal	1	6	Ironstone		2
Coal, bony		7	Coal		8
Coal		5	Floor, coal, bony:		
Parting		¾	Thickness of bed and sample	4	2¾

Sample A11086 was taken from 1 east chute, 20 feet above counter, 1,300 feet north of No. 4 bed in new tunnel.

Sample A11085 (No. 6 bed) was taken from east gangway, 1,375 feet north of No. 4 bed in new tunnel; thickness of bed, 3 feet 7½ inches.

Sections of No. 8 bed in Evan Jones mine

Section	A		B		C	
Laboratory No.	A98201		B25076		B25077	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, shale:						
Coal		4		11	[a] 1	0
Bone		½		1		[a] 6
Coal		11½	2	2	[a] 1	0
Bone		1		4		[a] 6
Coal	2	9		1	1	0
Shale		1				
Bone				1		1½
Coal		2		6	2	6
Shale		1				
Bone						2
Rash				1		
Coal		2½				2
Shale		2½				
Bone						2
Coal		6				3
Bone						1
Coal						9
Rash						½
Floor, shale:						
Thickness of bed	5	5	4	3	8	3
Thickness of sample	5	5	4	3	5	3

[a] Not included in sample.

Sample A98201 was taken from south rib, 20 feet inside 23 chute, in main haulage gangway; sample B25076, from 40 room, 11 crosscut; and sample B25077, from gangway just inby 44 room.

Section of No. 10 bed in Evan Jones mine

Laboratory No.	B56287		Laboratory No.	B56287	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale:			Shale, coaly		[a] 5
Shale, coaly	[a] 1	6	Floor, not stated:		
Coal	3	2	Thickness of bed	8	8
Shale and bone	[a] 1	0	Thickness of sample	5	9
Coal	2	7			

[a] Not included in sample.

Sample B56287 was taken from face of last two coal seams in No. 10 bed, 413 feet from No. 8 bed, in new gangway.

System of mining, room-and-pillar. The coal was undercut by hand and shot down with explosives. It was screened on revolving screens and washed on a jig washer. The average daily output in 1940 was 200 tons.

Geologic relations are given in Geological Survey Bulletin 880d (pp. 204–208).

Kings River. Outcrops

Analysis 2218 (p. 54). Bituminous coal, Matanuska field, Kings River district, from outcrop on west bank of Kings River at upper bridge. Thickness of bed, 9 feet 11 inches; dip, 42° NE. The bed was measured and sampled at one point by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in outcrop on Kings River

Laboratory No.	2218		Laboratory No.	2218	
	Ft.	in.		Ft.	in.
Roof, not stated:			Coal, bony	1	0
Coal	2	5	Sandstone		[a] 1
Sandstone		[a] 2	Coal	3	4
Coal	1	4	Floor, not stated:		
Shale		[a] 1	Thickness of bed	9	11
Coal	1	5	Thickness of sample	9	7
Sandstone		1			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 284 (p. 94).

Analyses 18137, 18319, 18136, and 18147 (p. 54). Medium-volatile bituminous coal and natural coke, Matanuska field, Kings River district, from outcrops along banks of Kings River. Coal bed, No. 1. The bed was measured and sampled by J. T. Ryan (USBM) and G. W. Salisbury (USBM), September 13, 1913, as described below:

Section of No. 1 bed in outcrop on Kings River

Laboratory No.	18137		Laboratory No.	18137	
	Ft.	in.		Ft.	in.
Roof, shale:			Coal, shaly		[a] 8
Coal, bony		[a] 4	Coal, hard	1	0
Coal, bright	2	3	Shale		[a] 1
Shale		[a] 3	Coal, soft	2	2
Coal, bright	1	5	Floor, not stated:		
Coal, bony		1	Thickness of bed	9	6
Coal	1	3	Thickness of sample	8	2

[a] Not included in sample.

Sample 18137 was taken from outcrop on west bank of Kings River below lower bridge; dip, 37° E.; strike, N. 2° W. Sample 18319 was cut from outcrop on west bank of river, 600 feet below cabin. Sample 18136 (natural coke) was taken from outcrop on east bank of river, above rock tunnel, at point where an igneous sill divides the bed into two parts; thickness of sample, 3 feet 10 inches. Sample 18147 consisted of selected pieces of natural coke taken 15 feet right of point at which sample 18136 was taken.

Geologic relations are given in Geological Survey Bulletin 284 (p. 94).

Analysis 18151 (p. 54). Medium-volatile bituminous coal, Matanuska field, Kings River district, from outcrop on Kings River. Coal bed, No. 2; dip, 37° E.; strike, 2° W. The bed was measured and sampled at outcrop, 13 feet above No. 1 bed, by J. T. Ryan (USBM), September 13, 1913, as described below:

Section of coal bed in Kings River outcrop

Laboratory No.	18151		Laboratory No.	18151	
	Ft.	in.		Ft.	in.
Roof, shale:			Coal and pyrite	1	2
Coal and shale	[a] 1	2	Bone		½
Coal	1	0	Coal	2	6
Coal and bone		5	Floor, shale:		
Coal		9	Thickness of bed	7	4½
Shale		[a] 4	Thickness of sample	5	10½

[a] Not included in sample.

MATANUSKA RIVER. OUTCROP

Analysis 18144 (p. 54). Bituminous coal, Matanuska field, from outcrop on south bank of Matanuska River, 3 miles above mouth of Chickaloon River. Coal bed, unnamed; thickness of bed, 6 feet 6 inches, badly crushed with thin bone and shale partings; floor, shale and clay. The sample was taken by J. T. Ryan (USBM) and G. W. Salisbury (USBM), September 16, 1913.

Geologic relations are given in Geological Survey Bulletin 500 (p. 75).

MOOSE CREEK (STATION). BAXTER MINE

Analyses 85511 to 85514 (p. 54). High-volatile B bituminous coal, Matanuska field, Moose Creek district, from Baxter mine, 5 miles northeast of Moose Creek Station. Coal bed, "Big"; dip, 40°; strike, NE. The bed was measured and sampled at three points by B. W. Dyer (USBM), March 24, 1922, as described below:

Sections of "Big" bed in Baxter mine

Section	A		B		C	
Laboratory No.	85511		85512		85513	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, coal:						
Coal		10	1	6		5½
Parting		⅛		½		1
Coal	5	2	3	11		8½
Coal, bony				6		
Bone						½
Coal					4	2½
Floor, not stated:						
Thickness of bed and sample	6	⅛	5	11½	5	6

Sample 85511 was taken from rib, 2 chute, south gangway, 20 feet above counter; sample 85512, from high rib of aircourse, 15 feet outside 1 chute; and sample 85513, from high rib, south gangway, 40 feet inside tunnel.

The ultimate analysis of a composite made by combining samples 85511 to 85513 is given under laboratory No. 85514.

System of mining, room-and-pillar. The coal was undercut by hand and shot down with explosives. The mine was opened and operated during the winter of 1917-18 but later closed owing to faulted beds. It was reopened in 1921 and produced a small tonnage until 1925, when it was abandoned.

Geologic relations are given in Geological Survey Bulletin 712 (pp. 164-166) and Bureau of Mines Report of Investigations 3784.

MOOSE CREEK (STATION). BUFFALO MINE

Analyses B98926 to B98929, B98931 to B98933, and B98935 to B98937 (p. 56). High-volatile B bituminous coal, Matanuska field, Moose Creek district, from Buffalo mine, an adit and shaft mine 1,015 feet above sea level, 4 miles from Moose Creek, 12 miles north of Palmer, in sec. 23, T. 19 N., R. 2 E. Coal beds, Nos. 1 to 7; dip, 65° SE.; strike, N. 41° E. The beds were measured and sampled by S. C. Bjorklund (USBM), February 10, 1943, as described below:

Section of No. 1 bed in Buffalo mine

Laboratory No.	B98926		Laboratory No.	B98926	
	Ft.	*in.*		*Ft.*	*in.*
Hanging wall, shale:			Shale		½
Coal		6	Coal		7
Shale		1½	Coal, bony		5
Coal	2	0	Coal, dirty		8
Shale		½	Shale	[a] 1	0
Coal		2	Foot wall, shale:		
Shale		½	Thickness of bed	7	0
Coal	1	5	Thickness of sample	6	0

[a] Not included in sample.

Sample B98926 was taken from south face of 1 gangway, 65 feet from main entry. Sample B98928 (No. 2 bed) representing 6 feet 8 inches of clean, broken coal, was taken in shaft 92 feet below 2 gangway, 210 feet southwest of main entry. Sample B98927 (No. 2 bed), representing 4 feet 4 inches of clean, broken coal, was taken 6 feet from north face of 2 gangway, 850 feet northeast of main entry. Sample B98929 (No. 3 bed), representing 2 feet 5 inches of clean, broken coal, was taken at north face of 3 gangway, 185 feet from main entry. Sample B98931 (No. 4 bed), representing 2 feet 10 inches of fairly clean, broken coal, was taken from north wall of main entry at intersection of No. 4 bed. Sample B98933 (No. 5 bed, upper bench), representing 2 feet 2 inches of clean coal, and sample B98932 (No. 5 bed, lower bench), representing 3 feet 5 inches of coal with a 1-inch shale parting in middle, were taken at north wall of main entry at intersection with No. 5 bed. Sample B98935 (No. 6 bed), representing 4 feet 6 inches of clean coal, was taken from north wall of "Badger Hole" extension of main entry at intersection of No. 6 bed. Sample B98937 (No. 7 bed, upper bench), representing 1 foot 6 inches of clean coal, and sample B98936 (No. 7 bed, lower bench), representing 1 foot 10 inches of clean, broken coal, were taken from north wall of Badger Hole extension of main entry at intersection of No. 7 bed.

System of mining, room-and-pillar. The coal was undercut by hand and shot down with dynamite. It was screened on a shaker screen to produce nut and steam sizes. The mine was in the prospect stage and had not reached commercial production.

Geologic relations are given in Bureau of Mines Report of Investigations 3784.

Moose Creek (Station). Howard & Jesson (LeRoy) Mine

Analyses A1963 to A1965 (p. 56). High-volatile B bituminous coal, Matanuska field, Moose Creek district, from Howard & Jesson (LeRoy) mine, a tunnel mine 1,200 feet above sea level, 8 miles north of Moose Creek. Coal beds, Nos. 3, 4, and 5; dip, 65°; strike, N. 32° E. Each of the three beds was measured and sampled at one point by J. J. Carey (USBM), May 11, 1924, as described below:

Sections of Nos. 3, 4, and 5 beds in Howard & Jesson (LeRoy) mine

Section	A		B		C	
Laboratory No	[a] A1963		[b] A1964		[c] A1965	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Roof, shale and bony coal:						
Coal	6	0	10	0	1	5
Shale, sandy		[d] 3				[d] 1
Coal	1	9			3	6
Sandstone		[d] 1				
Coal	3	10				
Floor, bone and shale:						
Thickness of bed	11	11	10	0	5	0
Thickness of sample	11	7	10	0	4	11

[a] No. 3 bed.
[b] No. 4 bed.
[c] No. 5 bed.
[d] Not included in sample.

Sample A1963 was taken 390 feet south of portal; sample A1964, 400 feet south of portal; and sample A1965, 415 feet south of portal.

Further information may be obtained from Mineral Resources of Alaska: Geology and Coal Resources of the Western Part of the Lower Matanuska Coal Field, Alaska, by T. G. Payne and D. M. Hopkins, published by the Geological Survey, Department of the Interior.

Moose Creek (Station). New Black Diamond (Rawson) Mine

Analyses 82919 to 82921 (p. 56). Bituminous coal, Matanuska field, Moose Creek district, from New Black Diamond (Rawson) mine, a tunnel mine 8½ miles from Moose Creek. Coal bed, No. 3; thickness, 8 feet 6 inches; dip, 60° N.; strike, S. 82° E. Samples 82919 and 82920 were taken from opposite sides of a stock pile by B. W. Dyer (USBM), October 19, 1921.

The ultimate analysis of a composite made by combining the two samples is given under laboratory No. 82921.

This mine was first known as Rawson. Some coal was produced in development work, which was discontinued in 1926. In 1932 the Wishbone Hill Coal Co. reopened the mine, but only a small quantity of coal was produced. These workings were taken over in 1934 by the New Black Diamond Coal Co.

Further information may be obtained from Bureau of Mines Report of Investigations 3784.

Moose Creek (Station). Premier Mine

Analysis A1962 (p. 58). High-volatile B bituminous coal, Matanuska field, Moose Creek district, from Premier mine, 4 miles north of Moose Creek Station. Coal bed, No. 2; thickness, 7 feet. The bed was measured and sampled near top of chute at counter, 250 feet below collar of slope, by M. L. Sharp (USBM), May 5, 1924.

The mine was opened in 1925 by the Alaska Matanuska Coal Co. After the railroad was extended to Premier in 1926 it became the principal producer in the Moose Creek district. In 1933 water broke through and flooded the workings; a small tonnage, however, was produced daily from beds above water level until the mine was closed in 1943.

Further information may be obtained from Geological Survey Bulletin 857 (pp. 66–67) and Bureau of Mines Report of Investigations 3784.

Moose Creek (Station). Prospects

Analyses C31928 to C31930 (p. 58). Weathered and high-volatile C bituminous coals, Matanuska field, Moose Creek district, from three prospects ¼ mile east of Howard & Jesson (LeRoy) mine, 8¼ miles north of Moose Creek, in sec. 13, T. 19 N., R. 2 E. Coal beds, unknown. The beds were measured and sampled by James Hulbert (UBSM), November 17 to 19, 1944, as described below:

Sections of coal beds in prospects

Section	A		B		C	
Laboratory No.	[a] C31928		[b] C31929		[c] C31930	
	Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*
Hanging wall:	([d])		([e])		([d])	
Shale		[d] 7	--	--	--	--
Bone	--	--	--	--		[f] 3
Coal	[f] 2	1		[f] 3		[f] 2
Shale	[f] 2	4	--	--	--	--
Coal, bony	--	--		[f] 3		[f] 5
Coal	2	6	3	3	1	2
Clay		1		1		½
Coal	4	2		7	3	1
Coal, bony		[f] 4	--	--	--	--
Clay	--	--		1	--	--
Shale	--	--	--	--		1
Coal	--	--	2	3	1	8
Coal, bony	--	--	--	--		[f] 8
Floor, not stated:						
Thickness of bed	12	1	6	9	7	6½
Thickness of sample	6	9	6	3	6	½

[a] Prospect in No. 1 gully.
[b] Prospect in No. 2 gully.
[c] Prospect in No. 3 gully.
[d] Shale.
[e] Bone.
[f] Not included in sample.

Young Creek. Outcrops

Analysis 2223 (p. 58). Bituminous coal, Matanuska field, Young Creek district, from outcrop at an elevation of 1,585 feet, on west bank of Young Creek, 3 miles above trail. The bed comprised 1 foot of coal, 15 feet of shale, and 6 inches of coal; dip, 20° NW. It was measured and sampled by G. C. Martin (USGS) in 1905. The sample represented 1 foot 6 inches of coal.

Geologic relations are given in Geological Survey Bulletin 500 (pp. 42–52, 72–78).

Analysis 11382 (p. 58). Bituminous coal, Matanuska field, Young Creek district, from outcrop near Young Creek; longitude 148°42′12″ W., latitude

61°47′47″ N. Thickness of bed, 12 feet 8 inches; dip, 54° SE.; strike, N. 67° E. The bed was sampled by G. C. Martin (USGS), August 11, 1910, from natural outcrop after weathered coal was removed. It was measured on north face of Red Mountain, 4 miles north of mouth of Young Creek. Several other beds of undetermined thickness were observed above this bed.

Geologic relations are given in Geological Survey Bulletin 480 (p. 129).

ALASKA GULF REGION

BERING RIVER FIELD

BARRETT CREEK. CUNNINGHAM CLAIM OUTCROPS

Analyses 12716, 12709, 12707, 12708, 12714, 12710, 12718, 12712, and 12711 (p. 60). Low-volatile bituminous coal, Bering River field, from outcrops on Cunningham claim on Barrett Creek, ¾ mile above junction of Barrett and Clear Creeks, approximately 25 miles northeast of Katalla. The samples were taken August 19, 1911.

Sample 12716 (first and lowest bed in series) represented 5 feet of coal. Sample 12709 (second bed) represented 2 feet of coal. Sample 12707 (third bed) was taken 15 or 20 feet above second bed; thickness of bed not given. Sample 12708 was taken from fourth bed in series. Samples 12714 and 12710 (fifth bed) were taken 350 feet up Barrett Creek from fourth bed. Sample 12718 (sixth bed) was taken 20 to 30 feet above fifth bed. Sample 12712 (seventh bed) was taken 150 feet upstream from sixth bed. Sample 12711 was taken from bank of tributary of Clear Creek, 1,000 feet above mouth of Barrett Creek.

Geologic relations are given in Report on Coal in Alaska for Use in United States Navy, House Document No. 876, 1914 (p. 38).

BERING LAKE. TUNNEL

Analysis 4427 (p. 60). Low-volatile bituminous coal, Bering River field, from tunnel on shore of Bering Lake, halfway between Poul Point and Dick Creek. Coal bed, unnamed; thickness of bed, 6 feet 6 inches; thickness of sample, 4 feet; roof and floor, shale; dip, 72° NW. The bed was measured and sampled at one point by G. C. Martin (USGS) in 1906.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 81).

CANYON CREEK. PROSPECTS

Analyses 4433 and 4461 (p. 62). Anthracite, Bering River field, from prospects on tributary to Canyon Creek, on east side and next below Hunt's Cabin. Coal bed, unnamed; roof and floor, shale; dip, 31° NE. The bed was measured and sampled at two points by G. C. Martin (USGS) in 1906. Samples 4433 and 4461 represented 2 feet 7 inches and 6 feet 9 inches of coal, respectively.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 69).

CARBON CREEK. PROSPECT TUNNEL

Analysis 2492 (p. 62). Low-volatile bituminous coal, Bering River field, from prospect tunnel on south bank of Carbon Creek. Coal bed, unnamed; thickness of bed and sample, 8 feet 11 inches; roof, arkose; floor, shale. The bed was measured and sampled by G. C. Martin (USGS) in 1905.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 77).

CARBON MOUNTAIN (EAST SIDE). PROSPECTS

Analyses 2480, 2483, and 2487 (p. 62). Anthracite, Bering River field, from prospects on east side of Carbon Mountain. Coal beds, unnamed; roof and floor, shale. The beds in three prospects were measured and sampled by G. C. Martin (USGS) in 1905.

Sample 2480 was taken near hillside trail and represented 15 feet of coal; sample 2483, taken near sample 2480, represented 10 feet 6 inches of coal; and sample 2487, taken 200 feet below hillside trail, represented 4 feet 8 inches of coal.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 68).

Carbon Mountain (West Side). Outcrops

Analyses 2482 and 2496 (p. 62). Anthracite, Bering River field, from outcrops on west side of Carbon Mountain near Hunt's trail. Coal bed, unnamed; thickness of bed and sample, 10 feet (sample 2482) and 15 feet (sample 2496); roof and floor, shale. Samples 2482 and 2496 were taken at south and north ends of the trail, respectively, by G. C. Martin (USGS) in 1905.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 68).

Carbon Mountain (West Side). Prospects

Analyses 4459 and 4462 (p. 62). Semianthracite and anthracite, Bering River field, from prospects on west side of Carbon Mountain, opposite mouth of Canyon Creek. Coal beds, unnamed; roof and floor, shale; dip, 53° NW. The beds were measured and sampled by G. C. Martin (USGS) in 1906.

Sample 4459 represented 2 feet 7 inches of coal from a bed 4 feet 8 inches thick, 900 feet above sea level; and sample 4462, 1 foot 8 inches of coal from a bed 950 feet above sea level.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 70).

Clear Creek. Outcrops

Analyses 12713, 12715, and 12717 (p. 62). Natural coke and semianthracite, Bering River field, from outcrop in east wall of gorge below main falls, 4½ miles above mouth of Clear Creek. Three samples were taken from the bed November 4, 1911.

Sample 12713 was taken next to roof and represented 6 to 10 inches of natural coke; sample 12715 was taken next to coke and represented 6 to 8 inches of coal; and sample 12717 represented the main body of the bed of approximately 10 feet of coal.

Geologic relations are given in Report on Coal in Alaska for Use in United States Navy, House Document No. 876, 1914 (p. 38).

Analyses 4430 and 4460 (p. 62). Semianthracite (?), Bering River field, from outcrops on tributary of Clear Creek southeast of Monument Mountain. Coal bed, unnamed; dip, 30° NW. The bed was measured and sampled by G. C. Martin (USGS) in 1906, as described below:

Sections of coal bed on tributary of Clear Creek

Section	A		B	
Laboratory No.	4430		4460	
	Ft.	*in.*	*Ft.*	*in.*
Roof, shale:	1	10	[a] 1	4
Shale, hard	----	----		[a] 7
Bone		[a] 4	----	----
Shale, coaly	----	----	[a] 1	2
Coal		11	----	----
Shale	----	----	[a] 2	3
Coal, bony		[a] 7	----	----
Coal		3	3	0
Coal, shaly		[a] 3	----	----
Coal	3	3	----	----
Shale	[a] 5	0	----	----
Coal, shaly	[a] 2	0	----	----
Coal	[a] 1	0	----	----
Floor, shale:				
Thickness of bed	15	5	8	4
Thickness of sample	6	3	3	0

[a] Not included in sample.

Sample 4430 was taken at an elevation of 1,200 feet and sample 4460, at 1,450 feet.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 71).

Clear Creek. Prospects

Analyses 4431, 4435, and 4451 (p. 62). Semianthracite (?), Bering River field, from prospects on Clear Creek. The samples were taken by G. C. Martin (USGS) in 1906.

Sample 4431 was taken from tunnel on north bank of Clear Creek at top of falls and represented 18 feet of coal; sample 4435 was taken from tunnel on north bank of Clear Creek at base of falls and represented 5 feet of coal; and sample 4451 was taken from east bank of Clear Creek, 3 miles above mouth, and represented 4 feet of coal.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 72).

FALLS CREEK. CHRISTOPHER PROSPECT

Analysis 2488 (p. 64). Semianthracite (?), Bering River field, from Christopher prospect in cliffs of Falls Creek, 1 mile north of Bering Lake. Coal bed, unnamed; dip, 25° NE.; elevation, 110 feet. The bed was measured and sampled at one point by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in Christopher prospect

Laboratory No.	2488		Laboratory No.	2488	
	Ft.	*in.*		*Ft.*	*in.*
Roof, arkose:			Floor, shale, sandy:		
Coal	3	0	Thickness of bed	10	0
Coal and shale	[a] 3	0	Thickness of sample	7	0
Coal	4	0			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 79).

FALLS CREEK. OUTCROP

Analysis 4454 (p. 64). Semianthracite (?), Bering River field, from outcrop on tributary of Falls Creek, ½ mile northeast of Christopher's Cabin. Coal bed, unnamed; dip, 60° SE.; elevation, 200 feet. The bed was measured and sampled by G. C. Martin (USGS) in 1906, as described below:

Section of coal bed in outcrop near Christopher's Cabin

Laboratory No.	4454		Laboratory No.	4454	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale:			Shale, coaly		[a] 6
Coal	2	7	Floor, arkose:		
Shale		[a] 7	Thickness of bed	6	8
Coal		[a] 9	Thickness of sample	2	7
Shale	[a] 1	10			
Coal		[a] 5			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 79).

FOURTH BERG LAKE. OUTCROP

Analysis 2478 (p. 64). Anthracite, Bering River field, from outcrop 1⅔ miles up creek from Fourth Berg Lake. Coal bed, unnamed; dip, 55° SW.; elevation, 1,850 feet. The bed was measured and sampled by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in outcrop near Fourth Berg Lake

Laboratory No.	2478		Laboratory No.	2478	
	Ft.	*in.*		*Ft.*	*in.*
Roof, shale:			Coal		8
Coal		8	Floor, shale:		
Shale, coaly		[a] 4	Thickness of bed	2	10
Coal		11	Thickness of sample	2	3
Shale, coaly		[a] 3			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 67).

KATALLA. CARBON MINE

Analyses 86751, 86750, 86745, 86743, 86744, and 86748 (p. 64). Low-volatile bituminous coal, Bering River field, from Carbon mine, 18 miles northeast of Katalla. The samples were taken at washing plant of coal mined in 1 chute, 16 gangway, No. 16 bed, by Capt. W. P. T. Hill (USMC), July 1922.

Sample 86751 represented run-of-mine coal; sample 86750, 2½-inch lump; sample 86745, 2½- by 1-inch (washed); sample 86743, 2½-inch slack; sample 86744, 1-inch slack; and sample 86748, 1-inch slack (washed).

KATALLA. SHIELD'S PROSPECT TUNNEL

Analyses 79356 to 79358 (p. 64). Low-volatile bituminous coal (noncaking), Bering River field, from Shield's prospect tunnel, 22 miles northeast of Katalla. Coal bed, No. 18; thickness of bed, 9 feet; thickness of sample, lower 3 feet; dip, 45° W.; strike, NE. The bed was measured and sampled at face, 1,500 feet from portal, by Capt. W. P. T. Hill (USMC), March 11, 1921.

The ultimate analysis of a composite made by combining samples 79356 and 79357 is given under laboratory No. 79358.

KUSHTAKA RIDGE (EAST SIDE). OUTCROPS AND TUNNEL

Analyses 4455, 4428, and 4463 (p. 64). Semianthracite, Bering River field, from outcrops and tunnel on east side of Kushtaka Ridge. Coal beds, unnamed; dip, 40° to 45° NW. The beds were measured and sampled by G. C. Martin (USGS) in 1906.

Sample 4455 was taken 1 mile northwest of cabin; elevation, 1,850 feet; thickness of bed and sample, 3 feet. Sample 4428 was taken 1½ miles northwest of cabin; elevation, 1,600 feet; thickness of bed and sample, 14 feet. Sample 4463 was taken from tunnel; elevation, 790 feet; thickness of bed and sample, 14 feet 6 inches.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 74–75).

LEEPER CREEK. OUTCROP

Analysis 4453 (p. 64). Semianthracite, Bering River field, from outcrop ⅓ mile above mouth of Leeper Creek (tributary of Shepherd Creek). Coal bed, unnamed; thickness of bed and sample, 8 to 11 feet; dip, 75° NW. The bed was measured and sampled by G. C. Martin (USGS) in 1906.

Geologic relations are given in Geological Survey Bulletin 355 (pp. 31–35, 77).

MOUNT ANN. OUTCROPS

Analyses 12719, 12720, and 12733 (p. 64). Semianthracite, Bering River field, from outcrops on Mount Ann. The bed was sampled by J. A. Holmes (USBM) in November 1911.

Sample 12719 was taken near top of Mount Ann; sample 12720, on side; and sample 12733, on top.

MOUNT HAMILTON. MCDONALD MINE

Analyses 12722, 12730, and 12731 (p. 66). Low-volatile bituminous coal, Bering River field, from McDonald mine, ½ mile south of United States Land Monument on Mount Hamilton. Coal bed, unnamed; thickness, 15 feet; dip, nearly vertical. The bed was measured and sampled at three points by J. A. Holmes (USBM) in August 1911.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35).

MOUNT HAMILTON. OUTCROP

Analyses 4437, 4452, and 4436 (p. 66). Low-volatile bituminous coal, Bering River field, from outcrop in gulch ⅝ mile southwest of Mount Hamilton. Coal bed, unnamed; dip, 52° NW.; elevation, 1,100 feet. Coal was found in two benches, separated by 30 feet of shale. The bed was measured and sampled at one point by G. C. Martin (USGS) in 1906, as described below:

Section of coal bed southwest of Mount Hamilton

Laboratory Nos	4437, 4452, 4436	
	Ft.	in.
Roof, shale:		
Coal	[a] 5	0
Shale	30	0
Shale, coaly	2	0
Coal, dirty	[b] 1	5
Shale		2
Coal, shaly	[b] 1	4
Shale		4
Coal, shaly	[b] 1	0
Do		6
Coal		9
Shale	1	0
Coal, dirty		4
Coal	[c] 1	8
Shale		2
Coal	4	6
Floor, sandstone, shaly:		
Thickness of bed	50	2

[a] Coal included in sample 4437.
[b] Coal included in sample 4452.
[c] Coal included in sample 4436.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 80).

NEVADA CREEK. PROSPECT TUNNEL

Analysis 2491 (p. 66). Semianthracite, Bering River field, from prospect tunnel near mouth of Nevada Creek. Coal bed, unnamed; thickness of bed and sample, 19 feet 7 inches; dip, 78° N.; roof, shale; floor, arkose. The bed was measured and sampled by G. C. Martin (USGS) in 1905.

POWERS CREEK. PROSPECT TUNNEL

Analysis 2493 (p. 66). Semianthracite, Bering River field, from prospect tunnel on Powers Creek, 1 mile north of Bering Lake. Coal bed, unnamed; dip, 35° NW. The bed was measured and sampled by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in tunnel on Powers Creek

Laboratory No	2493	
	Ft.	in.
Roof, not stated:		
Coal (concealed)	[a] 2	0
Shale	[a] 1	6
Coal	8	6
Floor, sandstone:		
Thickness of bed	12	0
Thickness of sample	8	6

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 77).

QUEEN CREEK. OUTCROPS

Analyses 2486 and 2495 (p. 66). Low-volatile bituminous coal, Bering River field, from outcrop on northwest bank of Queen Creek. The bed was measured and sampled at one point by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in outcrop on Queen Creek

Laboratory Nos	2486, 2495	
	Ft.	in.
Roof, shale:		
Coal	[a] 27	0
Shale (pocket?)	7	0
Coal	2	0
Shale	10	0
Coal	[b] 31	0
Floor, shale:		
Thickness of bed	77	0

[a] Sample 2486.
[b] Sample 2495.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 76).

Analysis 2494 (p. 66). Semianthracite, Bering River field, from outcrop on east branch of Queen Creek. The bed was measured and sampled by G. C. Martin (USGS) in 1905, as described below:

Section of coal bed in outcrop on Queen Creek

Laboratory No.	2494		Laboratory No.	2494	
	Ft.	in.		Ft.	in.
Roof, shale:			Shale	[a] 2	6
Coal	17	0	Coal	[a] 26	0
Shale	[a] 41	0	Floor, shale:		
Coal	[a] 4	0	Thickness of bed	98	6
Shale	[a] 5	0	Thickness of sample	17	0
Coal	[a] 3	0			

[a] Not included in sample.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 77).

SECOND BERG LAKE. OUTCROP

Analysis 2485 (p. 66). Anthracite, Bering River field, from outcrop in gulch at head of Second Berg Lake. Coal bed, unnamed; thickness of bed, 2 feet 8 inches; thickness of sample, 2 feet 2 inches; dip, 32° NE.; roof, sandstone; floor, shale. The bed was measured and sampled by G. C. Martin (USGS) in 1905. Six inches of bony coal on top was excluded from sample.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 67).

TOKUN CREEK. PROSPECT TUNNEL

Analysis 2490 (p. 66). Semianthracite, Bering River field, from lower prospect tunnel on Tokun Creek, 1½ miles above Lake Tokun. Coal bed, unnamed; thickness of bed and sample, 6 feet 8 inches; roof, arkose; floor, shale. The bed was measured and sampled by G. C. Martin (USGS) in 1905.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 79).

TROUT CREEK. CUNNINGHAM PROSPECT TUNNELS NOS. 4 AND 5

Analyses 15355 to 15360 (p. 66). Low-volatile bituminous coal, Bering River field, from Cunningham prospect tunnels on Trout Creek, ¼ mile down creek from Cunningham Cabin. No. 4 tunnel was 100 feet below No. 5 tunnel. The bed in No. 4 tunnel was measured and sampled at four points and that in No. 5 tunnel at two points by W. A. Selvig (USBM), November 12 to 22, 1912, as described below:

Sections of coal bed in prospect tunnel No. 4

Section Laboratory No.	A 15355		B 15356		C 15357		D 15358	
	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.
Roof, shale, sandstone, and coal:								
Coal	2	8	2	5			1	0
Charcoal, dirt, and shale		[a] 2½		[a] 5	[a] 2	3		[a] 5
Coal	1	2	1	8	5	8½	1	11
Charcoal, shale, and sulfur		[a] 1½		[a] 4		[a] ½		[a] 3
Coal	1	6			2	7¼	3	8
Floor, sandstone and coal:								
Thickness of bed	5	8	4	10	10	7¼	7	8
Thickness of sample	5	4	4	1	8	3¾	6	7

[a] Not included in sample.

Sample 15355 was taken in chute between timber sets 19 and 20, 76 feet from drift mouth and 10 feet from entry; sample 15356, on rib of right crosscut between timber sets 18 and 19, 72 feet from drift mouth and 17 feet from entry; sample 15357, on rib near face of right crosscut between timber sets 11 and 12, 44 feet from drift mouth; and sample 15358, in right crosscut between timber sets 25 and 26, 100 feet from drift mouth and 11 feet from entry.

Sections of coal bed in prospect tunnel No. 5

Section	A		B	
Laboratory No.	15359		15360	
	Ft.	*in.*	*Ft.*	*in.*
Roof, shale and coal:				
Coal	2	8	----------	
Shale and dirt		[a] 8	----------	
Coal	2	7	[a] 4	0
Charcoal and shale	[a] 1	7	[a] 1	7
Coal	----------		1	3
Floor, coal:				
Thickness of bed	7	6	6	10
Thickness of sample	5	3	5	3

[a] Not included in sample.

Sample 15359 was taken in chute at left of entry between timber sets 21 and 22, 84 feet from drift mouth and 17 feet up chute; and sample 15360, in left crosscut between timber sets 13 and 14, 52 feet from drift mouth and 5 feet from entry.

Geologic relations are given in Geological Survey Bulletin 335 (pp. 31–35, 72).

Wardall Ridge. Outcrops

Analyses 22932 and 22933 (p. 68). Weathered bituminous coal, Bering River field, from outcrops on west side of Wardall Ridge, in SE¼ sec. 10, T. 17 S., R. 8 E. Coal beds, unnamed; dip, 45° NW.; strike, N. 65° E. The beds were measured and sampled by G. W. Evans (USBM), August 17, 1915, as described below:

Sections of coal beds in outcrops on Wardall Ridge

Section	A		B	
Laboratory No.	22932		22933	
	Ft.	*in.*	*Ft.*	*in.*
Roof, sandstone, shale:				
Coal with shale	----------		7	0
Coal, bright	[a] 2	6	----------	
Shale	[a] 2	0	----------	
Coal	8	0	----------	
Coal, soft	[a] 5	0	----------	
Floor, shale, sandy:				
Thickness of bed	17	6	7	0
Thickness of sample	8	0	7	0

[a] Not included in sample.

The coal bed represented by sample 22932 was 30 feet above the one in sample 22933.

Yakataga. Outcrop

Analysis 19345 (p. 68). Weathered bituminous coal, Yakataga district, from outcrop on slope of Duktoth River Valley, 200 feet above floor and 25 miles from mouth of river. Coal bed, unnamed; thickness of bed and sample, 4 feet; dip, 35° N.; strike, N. 80° E.; roof and floor, shale. The sample was taken from outcrop by A. G. Maddren (USGS) in August 1913.

Geologic relations are given in Geological Survey Bulletin 592 (p. 148).

SOUTHEASTERN ALASKA REGION

Admiralty Island. Harkrader Mine

Analyses A43506 and A43507 (p. 68). High-volatile B bituminous coal, Admiralty Island district, from Harkrader mine, a shaft mine on Kootznahoo Inlet, west shore of Admiralty Island. Two samples were collected at the mine by B. D. Stewart (USBM) in June 1928.

Geologic relations are given in Geological Survey Bulletins 287 (pp. 151–154) and 824 (pp. 71–72).

Murder Cove. Prospect

Analysis 5796 (p. 68). Coal, Admiralty Island district, from prospect on Murder Cove.

Geologic relations are given in Geological Survey Bulletin 287 (pp. 152–153).

DESCRIPTION OF DELIVERED SAMPLES

By N. H. SNYDER[1] and R. J. SWINGLE[2]

EXPLANATION OF TABLE OF DESCRIPTION

The data in table 9 were taken from notes made by the persons who took the samples and supplement the description given in the table of analyses (p. 26).

The delivered samples were collected systematically throughout all deliveries and from storage piles by representatives of the Bureau of Mines and several other Government departments under directions supplied by the Bureau. All delivered samples were analyzed by M. L. Sharp at Anchorage, Alaska. Average analyses for the calendar year are given for these samples.

TABLE 9.—*Description of delivered samples*

Region, town or district, and mine	Approximate tons delivered	Place of delivery	Date of delivery	Index No.	Reference, page in this report
1	2	3	4	5	6
YUKON REGION					
Colorado Station:					
Costello Creek	81	Alaska Railroad	1941	1	30
Do	1,813	Fort Richardson and Alaska Railroad	1942	2	
Do	417	Alaska Railroad	1943	3	
Do	1,235	Fort Richardson	1944	4	
Suntrana:					
Suntrana	707	Alaska Railroad	1941	5	36
Do		Fort Richardson	1942	6	
Do		do	1943	7	
Do	1,917	do	1944	8	
Do	3,862	Alaska Railroad	1936	9	
Do	3,611	do	1937	10	
Do	3,574	do	1938	11	
Do	3,972	do	1939	12	
Do	2,654	do	1940	13	
Do	4,214	do	1941	14	
Do	2,186	do	1942	15	
Do	538	Fort Richardson	1944	16	
Do	1,023	Alaska Railroad	1939	17	
Do	1,151	do	1940	18	
Do	1,848	do	1941	19	
Do	3,616	Alaska Railroad and Ladd Field	1942	20	
Do	646	Alaska Railroad	1943	21	
Do	784	do	1932	22	
Do	2,217	do	1933	23	
Do	4,116	do	1936	24	
Do	3,776	do	1937	25	
Do	4,123	do	1938	26	
Do	5,069	do	1939	27	
Do	3,017	do	1940	28	
Do	5,229	do	1941	29	
Do	3,602	do	1942	30	
COOK INLET REGION					
Chickaloon:					
Coal Creek (Navy)	214	do	1928	31	48
Do	88	do	1929	32	
Do	282	do	1930	33	
Do	398	do	1933	34	

[1] Supervising engineer, Fuel-Inspection Section, Bureau of Mines.
[2] Senior scientific aide, Fuel-Inspection Section, Bureau of Mines.

Region, town or district, and mine	Approximate tons delivered	Place of delivery	Date of delivery	Index No.	Reference, page in this report
1	2	3	4	5	6
COOK INLET REGION—continued					
Eska:					
Eska	4,542	Alaska Railroad	1937	35	48
Do	8,051	do	1938	36	
Do	1,413	do	1939	37	
Do	6,459	do	1940	38	
Do	37,652	do	1941	39	
Do	52,267	do	1942	40	
Do	38,998	do	1943	41	
Do	16,434	do	1944	42	
Do	1,230	do	1938	43	
Do	285	do	1938	44	
Do	1,311	do	1944	45	
Do	12,924	do	1944	46	
Do	6,692	do	1938	47	
Jonesville:					
Evan Jones	2,361	S. S. General Gorgas	1937	48	50
Do	250	Lighthouse Service	1927	49	
Do	265	do	1930	50	
Do	294	do	1931	51	
Do	36	Signal Corps	1931	52	
Do	74	Lighthouse Service	1933	53	
Do	349	do	1936	54	
Do	303	do	1938	55	
Do	555	Bureau of Education	1930	56	
Do	1,836	Bureau of Indian Affairs	1931	57	
Do	37	Alaska Communication System	1936	58	
Do	1,462	Bureau of Indian Affairs	1936	59	
Do	1,407	Alaska Railroad and Bureau of Indian Affairs.	1937	60	
Do	1,660	do	1938	61	
Do	1,348	Alaska Railroad, Signal Corps, Lighthouse Service, and Bureau of Indian Affairs.	1939	62	
Do	449	Alaska Railroad and Bureau of Indian Affairs.	1940	63	
Do	358	Bureau of Indian Affairs	1941	64	
Do	13,344	Alaska Railroad, Fort Richardson, and Bureau of Indian Affairs.	1942	65	
Do	7,207	Fort Richardson and Bureau of Indian Affairs.	1943	66	
Do	5,019	do	1944	67	
Do	259	Signal Corps and Bureau of Indian Affairs.	1938	68	
Do	386	Alaska Railroad and Bureau of Indian Affairs.	1939	69	
Do	1,118	do	1940	70	
Do	52	Alaska Railroad	1941	71	
Do	1,875	Quartermaster Corps, Fort Richardson, and Bureau of Indian Affairs.	1942	72	
Do	7,030	Fort Richardson	1943	73	
Do	16,715	Bureau of Indian Affairs and Fort Richardson.	1944	74	
Do	3,286	Alaska Railroad and Bureau of Indian Affairs.	1939	75	
Do	--------	Fort Richardson	1940	76	
Do	2,783	Alaska Railroad	1943	77	
Do	354	do	1936	78	
Do	883	do	1937	79	
Do	2,413	do	1937	80	
Do	220	Lighthouse Service	1928	81	
Do	16	River Boat Service	1931	82	
Do	34	Bureau of Public Roads	1932	83	
Do	343	Lighthouse Service	1932	84	
Do	1,549	Alaska Railroad	1936	85	
Do	2,455	do	1930	86	
Do	150	do	1931	87	
Do	11,128	do	1936	88	
Do	16,249	do	1937	89	
Do	18,595	do	1938	90	
Do	23,167	do	1939	91	
Do	32,537	do	1940	92	
Do	6,545	Alaska Railroad and Bureau of Indian Affairs.	1941	93	
Do	35,992	Alaska Railroad, Bureau of Indian Affairs, and Fort Richardson.	1942	94	

Region, town or district, and mine	Approximate tons delivered	Place of delivery	Date of delivery	Index No.	Reference, page in this report
1	2	3	4	5	6
COOK INLET REGION—continued					
Jonesville—Continued.					
Evan Jones	39,270	Bureau of Indian Affairs and Fort Richardson.	1943	95	54
Do	40,060	Alaska Railroad, Bureau of Indian Affairs, and Fort Richardson.	1944	96	
Moose Creek (Station):					
Buffalo	36	Alaska Railroad	1942	97	56
Do	200	Fort Richardson	1943	98	
Do	7,637	do	1944	99	
Do	157	Alaska Railroad	1941	100	
Do	41	do	1942	101	
Dougherty		Car sample	1929	102	56
Do		do	1929	103	
New Black Diamond (Rawson).	619	Alaska Railroad	1927	104	58
Do	33	do	1938	105	
Do	376	do	1935	106	
Do	872	do	1936	107	
Do	155	do	1937	108	
Do	2,842	do	1936	109	
Do	643	do	1937	110	
Do	40	do	1938	111	
Premier	40	Alaska Road Commission	1927	112	58
Do		Fort Richardson	1943	113	
Do	315	Lighthouse Service	1933	114	
Do	177	Bureau of Indian Affairs	1933	115	
Do		Fort Richardson	1943	116	
Do		do	1943	117	
Do	513	Alaska Railroad	1931	118	
Do	35	do	1942	119	
Do		Fort Richardson	1943	120	
Houston:					
Houston	35	Alaska Railroad	1937	121	60
Do	10	do	1939	122	
Do	40	do	1938	123	
Do	104	do	1939	124	
Do	73	do	1939	125	
Do	74	do	1937	126	
Do	130	do	1938	127	
Do	114	do	1939	128	
Do	36	do	1939	129	

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